



Agilent 1290 Infinity Valve Drive and Valve Heads

User Manual



Agilent Technologies

Notices

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This chapter gives an introduction to the module, instrument overview and internal connectors



Overview of the Valve Drive

The Agilent 1290 Infinity Valve Drive (G1170A) is the latest addition to the 1290 Infinity LC system. This is a valve drive delivered without a specific valve head. To be used in a HPLC system it is required to add a valve head to this device. It is compatible with all currently available Agilent Quick Change Valve heads (see [Table 1](#) on page 12)

It includes the following features:

- Built-in power supply
- Leak handling with a leak pane and a leak sensor underneath the valve head
- User exchangeable valve heads (Agilent Quick Change valve heads)
- Valve type and pressure detected by RF-ID tag
- Flexible mounting bracket, for left- or right-side mounting on LC stacks or at the Agilent Column Organizer (G1383A).

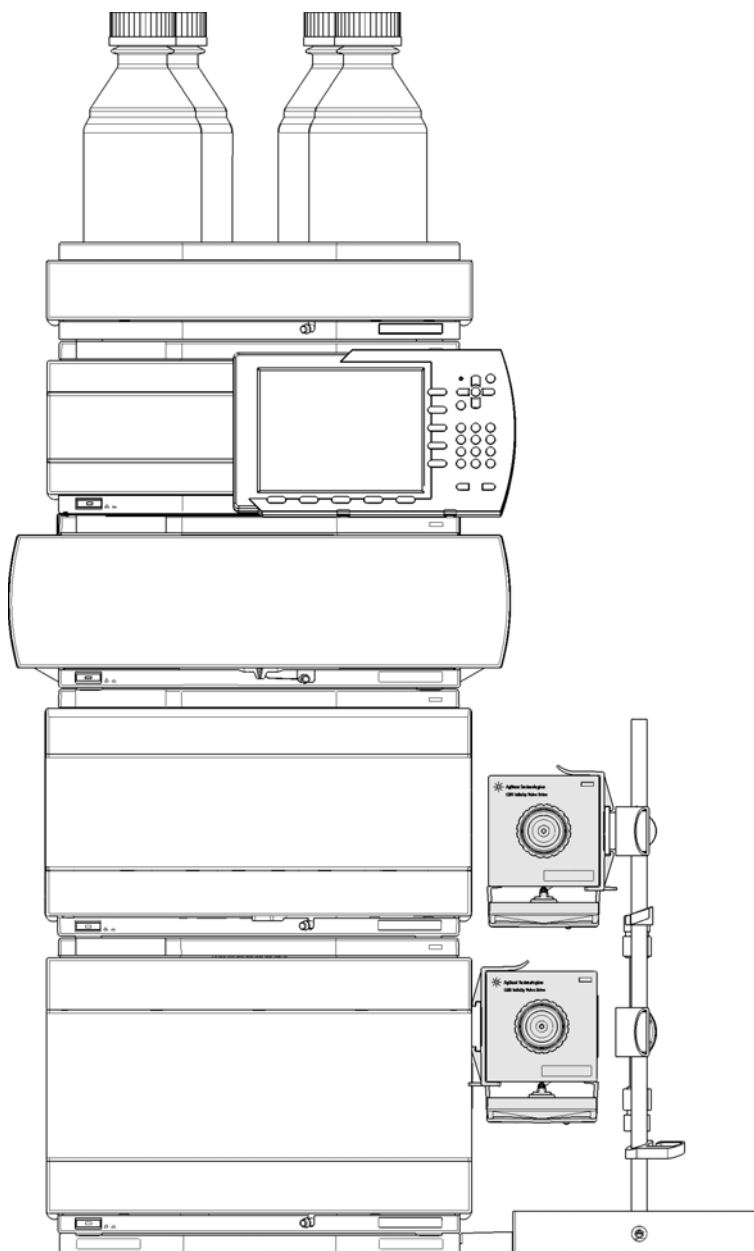
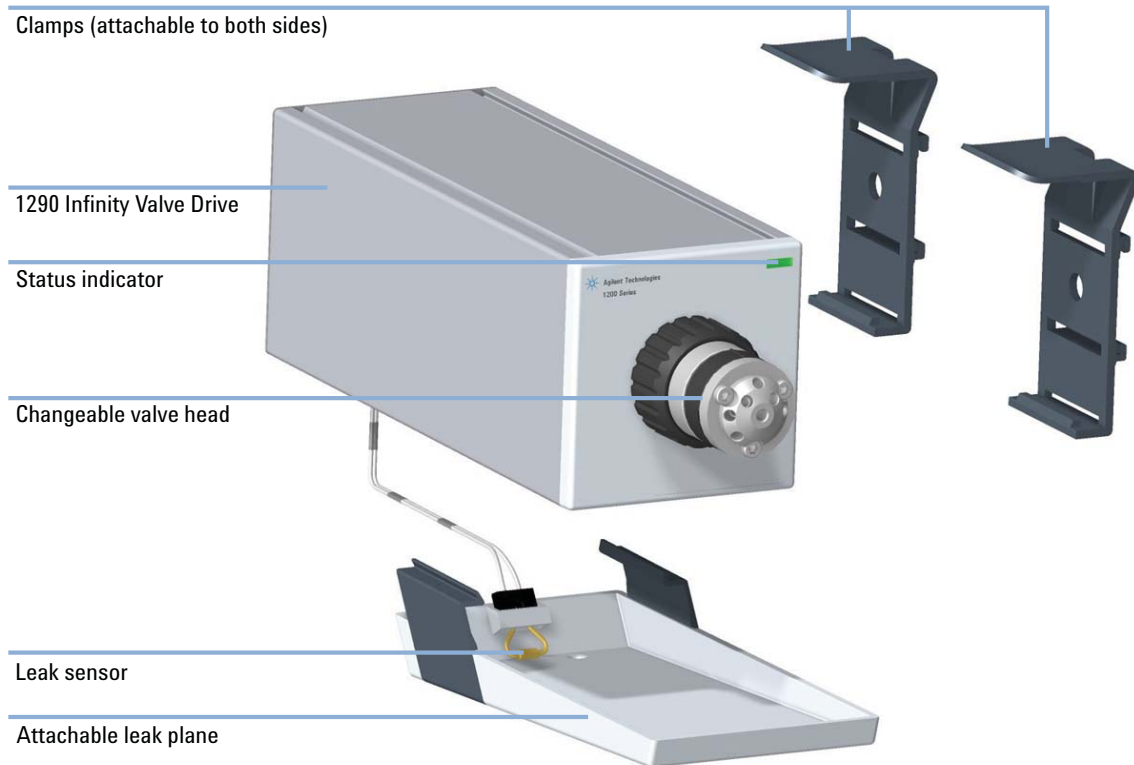


Figure 1 Mounting Examples for 1290 Infinity Valve Drive

1 Introduction to the Agilent 1290 Infinity Valve Drive and Valve Heads

Overview of the Valve Drive



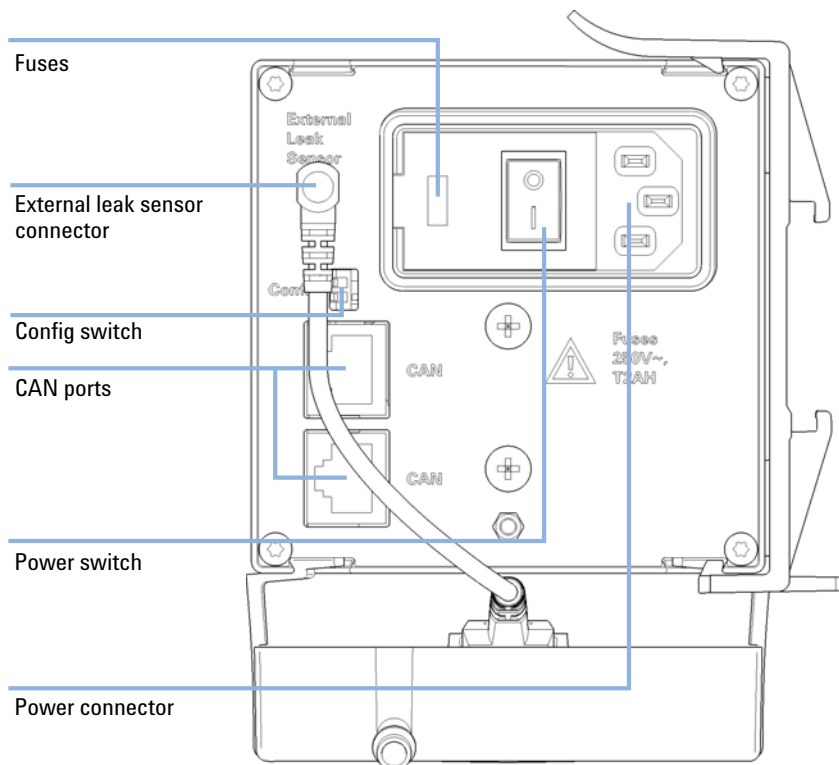


Figure 2 Rear View of 1290 Infinity Valve Drive

Overview of the Agilent Quick Change Valve Heads

The Agilent Quick Change Valve Heads can be installed to the G1316C 1290 Infinity TCC, G4227A 1290 Infinity Flexible Cube and to the G1170A 1290 Infinity Valve Drive.



For bio-inert modules use bio-inert parts only!

Table 1 Overview of the available Agilent Quick Change Valve Kits

Valve Kit PN	Pressure [bar]	Positions	Ports	Typical Application
G4230A	600	8	9	Method development solution kits
G4230B	1200	8	9	
G4231A	600	2	6	Any two-way switching, e.g. between two detectors, between waste and detector, between two columns, for G4231B 1200 2 6 matrix-stripping, for pre-concentration
G4231B	1200	2	6	
G4232A-micro	600	2	10	Anything a 2pos/6port valve can do plus alternating column regeneration. The G4232A can be used for standard as well as cap/nano applications (uses M4-fittings)
G4232B	1200	2	10	
G4234A	600	6	14	4 to 6 column selection
G4234B	1200	6	14	
G4235A	210	12	13	Solvent selection or fractionation
G5631A	600	2	6	Same as G4231A/B
G5639A	600	4	10	4 column selection

Typical Applications

The Infinity valve heads allow the user a variety of different applications. They can either be installed to a Infinity valve drive or to a G1316C TCC that is equipped with an internal valve actuator.

Examples of typical applications are:

- Dual and multiple column selection
- Sample enrichment and sample cleanup
- Alternating Column Regeneration
- Solvent selection

Dual and Multi Column Selection

Dual column selection

2pos/6port valve (p/n G4231A/B) and 2pos/10port valve (p/n G4232A/B)

Advantages:

- Increase productivity
- Higher instrument up-time

Quickly change between two different stationary phases to check your separation selectivity, or use two identical stationary phases to have the second column immediately available after the first one loses efficiency, for example with complex matrices.

Multi Column Selection

With the 6 position selection valve (G4234A/B) and the capillary kit for Column Selection you can set up your system for use with up to 6 columns as displayed in [Figure 3](#) on page 14. Or you can use the system with 5 columns and one flow path for flow injection analysis or for flushing the system. This setup allows you to switch between these columns for faster method development or method validation. The multi-column setup might also be used, if several operators are sharing system.

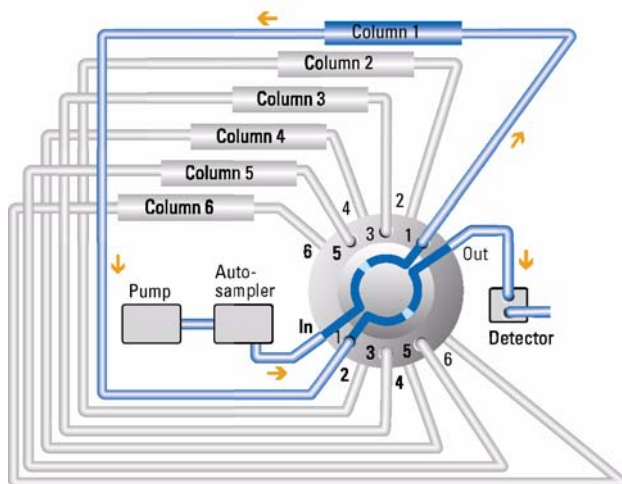


Figure 3 Multiple Column Selection (Example of Schematic Setup for 6 Column Selector)

Sample Enrichment and Sample Cleanup

2pos/6port valve (p/n G4231A/B) and 2pos/10port valve (p/n G4232A/B)

Advantages:

- Easy automation of sample preparation
- Higher reproducibility
- Increased productivity and sensitivity

Sample cleanup is essential for samples with complex matrices, such as biological fluids, food extracts and waste water. Before injection into a LC or LC/MS system, the sample matrix must be separated from the analytes of interest. Otherwise, contaminants can disrupt separation and detection or even damage the analytical column.

1 Introduction to the Agilent 1290 Infinity Valve Drive and Valve Heads

Typical Applications

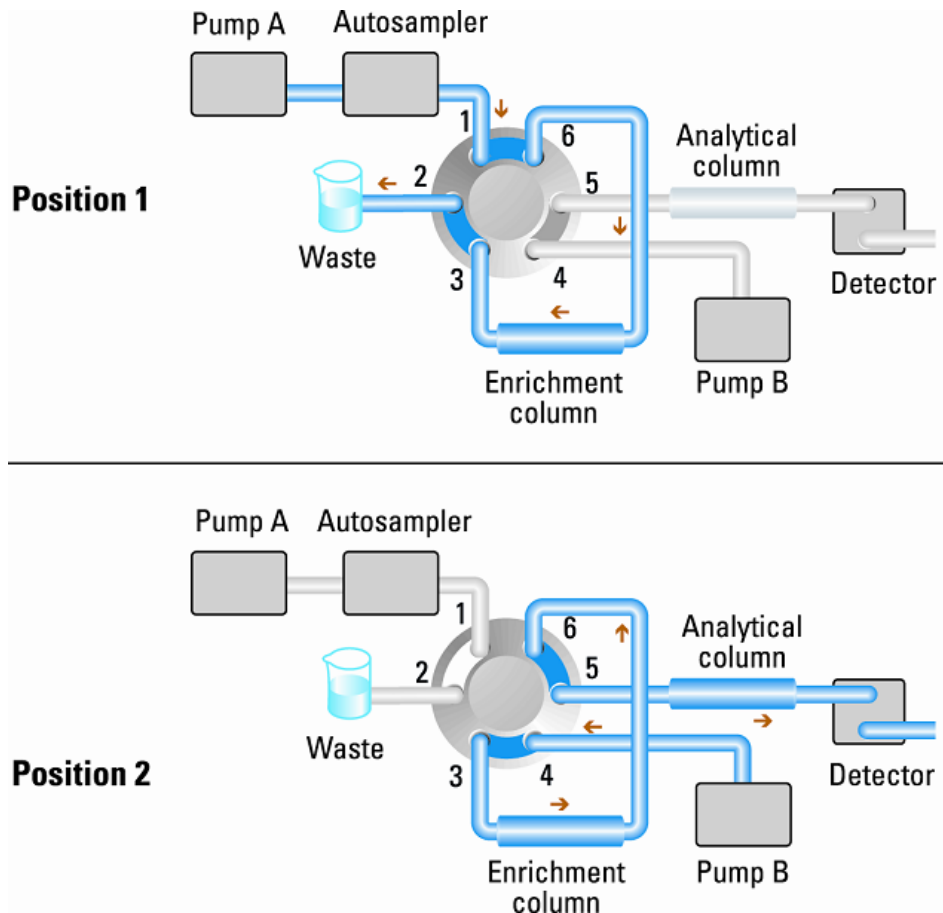


Figure 4 Sample enrichment

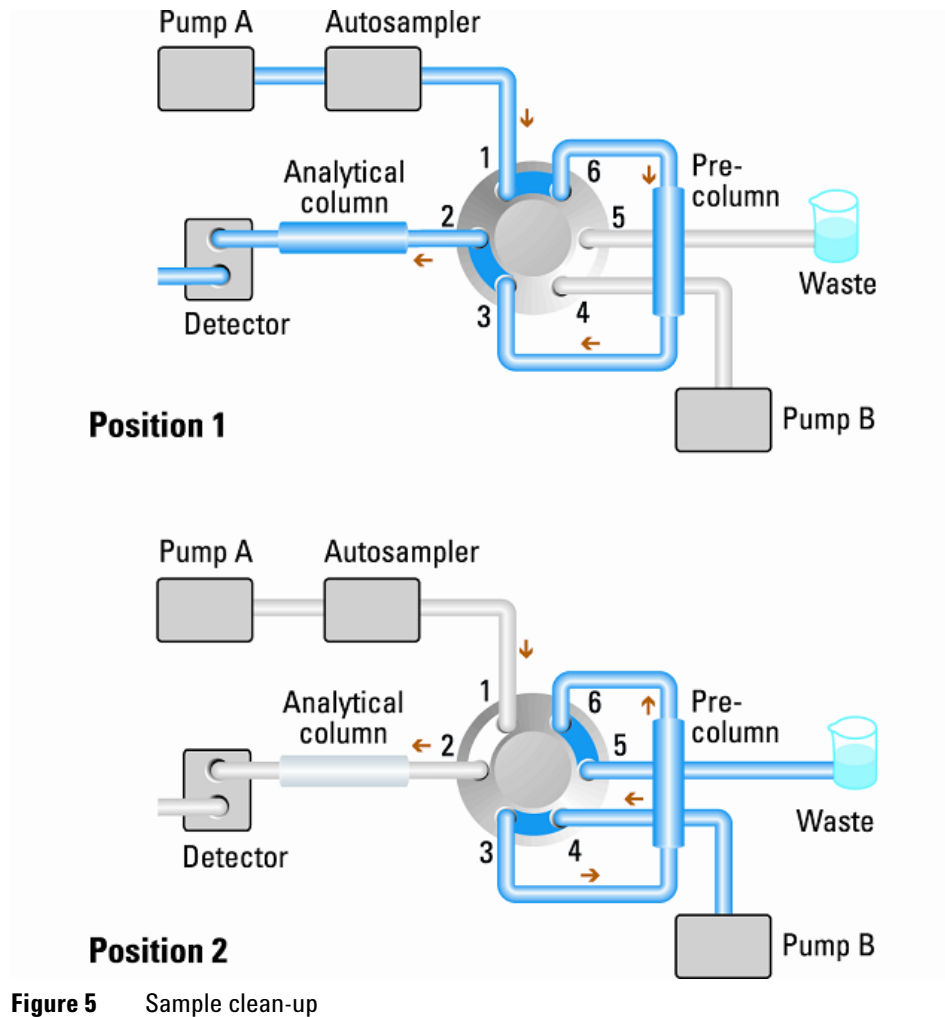


Figure 5 Sample clean-up

Enrichment methods

Enrichment methods are the technique of choice to obtain highest sensitivity and to remove the sample matrix in such applications as proteomics, drug metabolism and environmental trace analysis. The analytes are retained and concentrated onto the pre-column, while the sample matrix is passed to waste. After the valve switch, a second pump backflushes the analytes out of the pre-column onto the separation column. This allows injection of large volumes onto the pre-column, significantly expanding sensitivity in the range of ten to several thousands.

Stripping methods

Stripping methods handle analytes and matrices in the opposite way to enrichment methods. Matrix components are retained on the pre-column while the analytes pass through to the separation column. After the valve switches, an additional pump backflushes the matrix components out of the pre-column to waste, while the analytes are separated on the main column. Backflushing prepares the pre-column for the next injection.

Alternating Column Regeneration

Only 2pos/10port valve (p/n G4232A/B)

Advantages:

- High sample throughput
- Increased productivity
- High efficiency

Alternating column regeneration is a convenient way to increase the sample throughput. The Agilent 1200 Infinity Series 2 position/ 10 port valves can be used to increase the efficiency in laboratories running large amounts of samples. Gradient elution is a common technique for separation of complex samples in liquid chromatography, which requires column regeneration before the subsequent run is started. Using alternating column regeneration valuable time for the analysis is saved. Core of the alternating column regeneration is the Agilent 1200 Infinity Series 2 position / 10 port valves, which allows simultaneous analysis on one column while a second identical column is flushed and equilibrated.

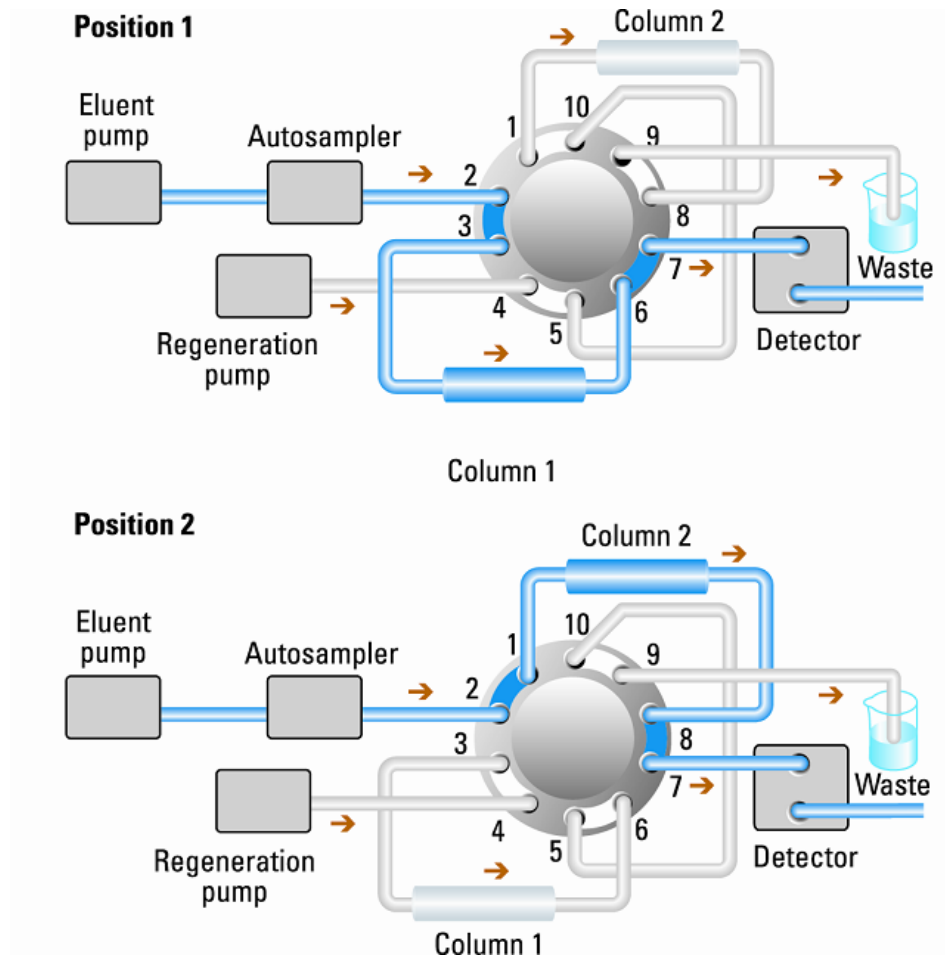


Figure 6 Alternating Column Regeneration

1 Introduction to the Agilent 1290 Infinity Valve Drive and Valve Heads Typical Applications

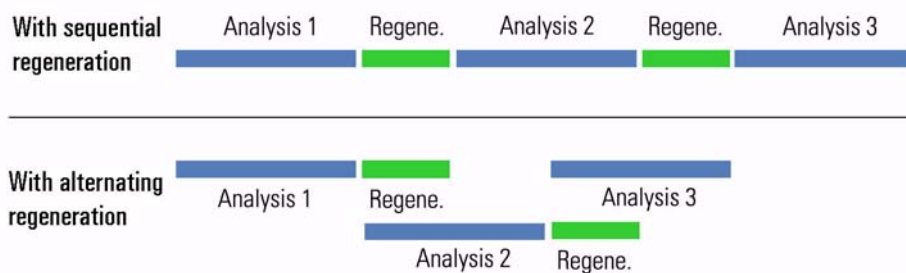


Figure 7 Alternate Column Regeneration (Time Scheme)

Solvent Selection

The 12pos/13port valve (p/n G4235A) can be used for solvent selection (flow rate < 10 mL/min) as illustrated in [Figure 8](#) on page 20. It offers automated access to 12 different eluents.

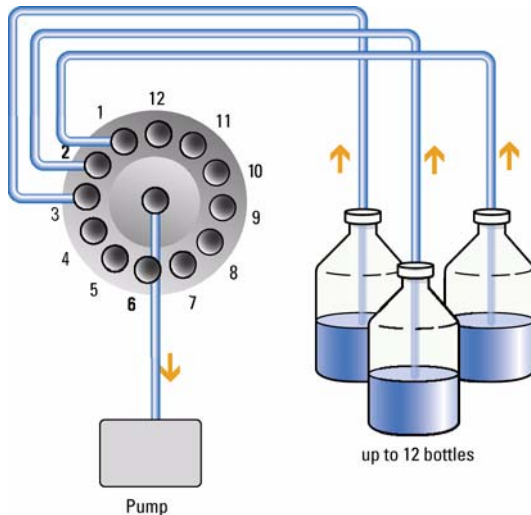


Figure 8 Solvent Selection (Schematic Setup)

Bio-inert Materials

For the Agilent 1260 Infinity Bio-inert LC system, Agilent Technologies uses highest quality materials in the flow path (also referred to as wetted parts), which are widely accepted by life scientists, as they are known for optimum inertness to biological samples and ensure best compatibility with common samples and solvents over a wide pH range. Explicitly, the complete flow path is free of stainless steel and free of other alloys containing metals such as iron, nickel, cobalt, chromium, molybdenum or copper, which can interfere with biological samples. The flow downstream of the sample introduction contains no metals whatsoever.

Table 2 Bio-inert Materials

Module	Materials
Agilent 1260 Infinity Bio-inert Quaternary Pump (G5611A)	Titanium, gold, platinum-iridium, ceramic, ruby, PTFE, PEEK
Agilent 1260 Infinity Bio-inert High-Performance Autosampler (G5667A)	Upstream of sample introduction: • Titanium, gold, PTFE, PEEK, ceramic Downstream of sample introduction: • PEEK, ceramic
Agilent 1260 Infinity Bio-inert Manual Injector (G5628A)	PEEK, ceramic
Agilent 1260 Infinity Bio-inert Analytical Fraction Collector (G5664A)	PEEK, ceramic, PTFE

1 Introduction to the Agilent 1290 Infinity Valve Drive and Valve Heads

Bio-inert Materials

Table 2 Bio-inert Materials

Module	Materials
Bio-inert Flow Cells:	
Standard flow cell bio-inert, 10 mm, 13 µl, 120 bar (12 MPa) for MWD/DAD, includes Capillary Kit Flow Cells BIO (p/n G5615-68755) (p/n G5615-60022) (for Agilent 1260 Infinity Diode Array Detectors DAD G1315C/D)	PEEK, ceramic, sapphire, PTFE
Max-Light Cartridge Cell Bio-inert (10 mm, V(σ) 1.0 µl) (p/n G5615-60018) and Max-Light Cartridge Cell Bio-inert (60 mm, V(σ) 4.0 µl) (p/n G5615-60017) (for Agilent 1200 Infinity Series Diode Array Detectors DAD G4212A/B)	PEEK, fused silica
Bio-inert flow cell, 8 µL, 20 bar (pH 1–12) includes Capillary Kit Flow Cells BIO (p/n G5615-68755) (p/n G5615-60005) (for Agilent 1260 Infinity Fluorescence Detector FLD G1321B)	PEEK, fused silica, PTFE
Bio-inert heat-exchanger G5616-60050 for 1290 Infinity Thermostatted Column Compartment (G1316C)	PEEK (steel-cladded)
Bio-inert Valve heads	G4235A, G5631A, G5639A: PEEK, ceramic (Al ₂ O ₃ based)
Bio-inert Connection capillaries	Upstream of sample introduction: • Titanium Downstream of sample introduction: • Agilent uses stainless-steel-cladded PEEK capillaries, which keep the flow path free of steel and provide pressure stability to more than 600 bar.

NOTE

To ensure optimum bio-compatibility of your Agilent 1260 Infinity Bio-inert LC system, do not include non-inert standard modules or parts to the flow path. Do not use any parts that are not labeled as Agilent “Bio-inert”. For solvent compatibility of these materials, see “Solvent information for parts of the 1260 Infinity Bio-inert LC system” on page 54.

Early Maintenance Feedback

Maintenance requires the exchange of components which are subject to wear or stress. Ideally, the frequency at which components are exchanged should be based on the intensity of usage of the module and the analytical conditions, and not on a predefined time interval. The early maintenance feedback (**EMF**) feature monitors the usage of specific components in the instrument, and provides feedback when the user-selectable limits have been exceeded. The visual feedback in the user interface provides an indication that maintenance procedures should be scheduled.

EMF Counters

EMF counters increment with use and can be assigned a maximum limit which provides visual feedback in the user interface when the limit is exceeded. Some counters can be reset to zero after the required maintenance procedure.

Using the EMF Counters

The user-settable **EMF** limits for the **EMF Counters** enable the early maintenance feedback to be adapted to specific user requirements. The useful maintenance cycle is dependent on the requirements for use. Therefore, the definition of the maximum limits need to be determined based on the specific operating conditions of the instrument.

Setting the EMF Limits

The setting of the **EMF** limits must be optimized over one or two maintenance cycles. Initially the default **EMF** limits should be set. When instrument performance indicates maintenance is necessary, take note of the values displayed by the **EMF counters**. Enter these values (or values slightly less than the displayed values) as **EMF** limits, and then reset the **EMF counters** to zero. The next time the **EMF counters** exceed the new **EMF** limits, the **EMF** flag will be displayed, providing a reminder that maintenance needs to be scheduled.

1 Introduction to the Agilent 1290 Infinity Valve Drive and Valve Heads

Early Maintenance Feedback



2

Site Requirements and Specifications

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Physical Specifications 29

Performance Specifications 30

This chapter provides information on environmental requirements, physical and performance specifications.



Site Requirements

A suitable environment is important to ensure optimal performance of the instrument.

Power Considerations

The module power supply has wide ranging capability. It accepts any line voltage in the range described in [Table 3](#) on page 29. Consequently there is no voltage selector in the rear of the module. There are also no externally accessible fuses, because automatic electronic fuses are implemented in the power supply.

WARNING

Hazard of electrical shock or damage of your instrumentation can result, if the devices are connected to a line voltage higher than specified.

→ Connect your instrument to the specified line voltage only.

WARNING

The module is partially energized when switched off, as long as the power cord is plugged in.

Repair work at the module can lead to personal injuries, e.g. electrical shock, when the cover is opened and the module is connected to power.

→ Always unplug the power cable before opening the cover.

→ Do not connect the power cable to the instrument while the covers are removed.

CAUTION

Inaccessible power plug.

In case of emergency it must be possible to disconnect the instrument from the power line at any time.

→ Make sure the power connector of the instrument can be easily reached and unplugged.

→ Provide sufficient space behind the power socket of the instrument to unplug the cable.

Power Cords

Different power cords are offered as options with the module. The female end of all power cords is identical. It plugs into the power-input socket at the rear. The male end of each power cord is different and designed to match the wall socket of a particular country or region.

WARNING

Absence of ground connection or use of unspecified power cord

The absence of ground connection or the use of unspecified power cord can lead to electric shock or short circuit.

- Never operate your instrumentation from a power outlet that has no ground connection.
 - Never use a power cord other than the Agilent Technologies power cord designed for your region.
-

WARNING

Use of unsupplied cables

Using cables not supplied by Agilent Technologies can lead to damage of the electronic components or personal injury.

- Never use cables other than the ones supplied by Agilent Technologies to ensure proper functionality and compliance with safety or EMC regulations.
-

WARNING

Unintended use of supplied power cords

Using power cords for unintended purposes can lead to personal injury or damage of electronic equipment.

- Never use the power cords that Agilent Technologies supplies with this instrument for any other equipment.
-

Bench Space

The module dimensions and weight (see [Table 3](#) on page 29) allow you to place the module on almost any desk or laboratory bench. It needs an additional 2.5 cm (1.0 inches) of space on either side and approximately 8 cm (3.1 inches) in the rear for air circulation and electric connections.

If the bench shall carry a complete HPLC system, make sure that the bench is designed to bear the weight of all modules.

The module should be operated in a horizontal position.

Condensation

CAUTION

Condensation within the module

Condensation will damage the system electronics.

- Do not store, ship or use your module under conditions where temperature fluctuations could cause condensation within the module.
 - If your module was shipped in cold weather, leave it in its box and allow it to warm slowly to room temperature to avoid condensation.
-

Physical Specifications

Table 3 Physical Specifications

Type	Specification	Comments
Weight	1.9 kg (4.3 lbs)	
Dimensions (height × width × depth)	95 x 95 x 300 (3.7 x 3.7 x 11.8 inches)	
Line voltage	100 – 240 VAC, ± 10 %	Wide-ranging capability
Line frequency	50 or 60 Hz, ± 5 %	
Power consumption	20VA, 4W, 14BTU	
Ambient operating temperature	4–55 °C (39–131 °F)	
Ambient non-operating temperature	-40 – 70 °C (-4 – 158 °F)	
Humidity	< 95 %, at 25 – 40 °C (77 – 104 °F)	Non-condensing
Operating altitude	Up to 2000 m (6562 ft)	
Non-operating altitude	Up to 4600 m (15091 ft)	For storing the module
Safety standards: IEC, CSA, UL	Installation category II, Pollution degree 2	For indoor use only.

Performance Specifications

Table 4 Performance Specifications Agilent 1290 Infinity Valve Drive

Type	Specification	Comments
External leak sensor	YES	Same functionality as internal sensor
Fuse	2.0 A250 V	High Breaking Capacity Fuse, exchangeable
Valve types	All Agilent Quick Change Valve heads	(refer to Table 5 on page 30)
Valve identification	By RFID tag	For valve type, pressure rating serial number, counter

Table 5 Specifications Agilent Quick Change Valve Heads

Kit PN	Valve PN	Description	max. Pressure [bar]	Fittings	Port-Port Volume	Liquid Contact	pH Range
G4230A/B	5067-4107	8 pos/9 port high pressure valve head	600	10-32	0.55 µL	PEEK, SST	0-14 ¹
G4230B	5067-4121	8 pos/9 port UHP valve head	1200	10-32	0.55 µL	Vespel, SST	0-10 ²
G4231A	5067-4137	2 pos/6 port valve head	600	10-32	0.51 µL	PEEK, SST	0-14 ¹
G4231B	5067-4117	2 pos/6 port valve head	1200	10-32	0.51 µL	Vespel, SST	0-10 ²
G4232A	5067-4144	2 pos/10 port micro valve head	600	M4	89.0 nL	PEEK, SST	0-14 ¹
G4232B	5067-4118	2 pos/10 port UHP valve head	1200	10-32	0.22 µL	Vespel, SST	0-10 ²
G4234A	5067-4146	6 pos/14 port valve head for column selection	600	M4	special ³	PEEK, SST	0-14 ¹
G4234B	5067-4142	6 pos/14 port UHP valve head for column selection	1200	M4	special ³	Vespel, SST	0-10 ²

Table 5 Specifications Agilent Quick Change Valve Heads

Kit PN	Valve PN	Description	max. Pressure [bar]	Fittings	Port-Port Volume	Liquid Contact	pH Range
G4235A	5067-4159	12 pos/13 port selection valve head (bio-inert)	210	10-32	16.4 µL	PEEK, Ceramic	0-14 ¹
G5631A	5067-4148	2 pos/6 port valve head (bio-inert)	600	10-32	1.71 µL	PEEK, Ceramic	0-14 ¹
G5639A	5067-4134	4 pos/10 port valve head for column selection (bio-inert)	600	10-32	special ³	PEEK, Ceramic	0-14 ¹

¹ incompatible with some mineral acids. For more information see Solvent Information.

² Incompatible with concentrated mineral acids, compatible with pH less than 10, compatible with most organics, may experience swelling with some organics containing functional groups such as nitro benzene, at elevated temperatures.

³ pre-column volume G4234A/B: 0.51 µL, G5639A: 0.81 µL; post column volume G4234A/B: 1.28 µL, G5639A: 1.33 µL

Shipping and Storage Temperature: -40 – 80 °C

NOTE

Shipping, storing or operating this valve below 0 °C with water in the fluid passages may cause failure of the sealing surfaces.

NOTE

Operating valves above their maximum pressure limit will harm them. Please set a corresponding max. pressure limit in your Chromatographic Data System if a valve is positioned in the high pressure path.

2 Site Requirements and Specifications

Performance Specifications



3

Installing the Module

Unpacking the Module 34

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Installing the Valve Heads 42

This chapter gives information about the installation of the valve drive and the valve heads.



Unpacking the Module

Damaged Packaging

If the delivery packaging shows signs of external damage, please call your Agilent Technologies sales and service office immediately. Inform your service representative that the instrument may have been damaged during shipment.

CAUTION

"Defective on arrival" problems

If there are signs of damage, please do not attempt to install the module. Inspection by Agilent is required to evaluate if the instrument is in good condition or damaged.

- Notify your Agilent sales and service office about the damage.
 - An Agilent service representative will inspect the instrument at your site and initiate appropriate actions.
-

Delivery Checklist

Ensure all parts and materials have been delivered with your module. The delivery checklist is shown below. For parts identification please check the illustrated parts breakdown in [“Parts and Materials”](#) on page 91. Please report any missing or damaged parts to your local Agilent Technologies sales and service office.

Table 6 Delivery Checklist

Description	Quantity
1290 Infinity Valve Drive	1
Valve rail assembly (p/n 5067-4634)	Optional
Rail assy for column organizer (p/n 5067-1510)	Optional
Agilent LC Hardware Documentation DVD (p/n G4800-64500)	1
Power cable	1
LAN Interface Card (p/n G1369-60012)	Optional (required if no proper hosting module is available, see “Agilent 1200 Infinity Series Interfaces” on page 137)
Accessory Kit (p/n G1170-68705)	1

Accessory Kit

The 1290 Infinity Valve Drive is shipped with Accessory Kit (p/n G1170-68705) (see [“Accessory Kit”](#) on page 96).

Installing the Valve Drive

Installing the Valve Drive

The 1290 Infinity Valve Drive can be installed in different ways.

It can be attached to either side of your Instrument with the use of the Valve Rail. (1260 and 1290 Series Pumps and Detectors, for older modules order new cover kits) or it can be mounted to a G1383A column organizer by using the optional column stand mount.

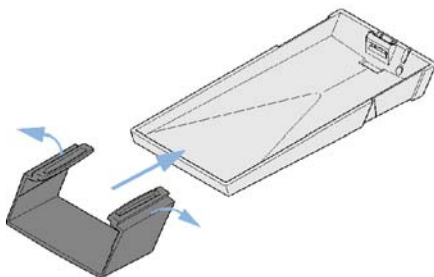
Assembling and Installing the Leak Tray and Leak Sensor

NOTE

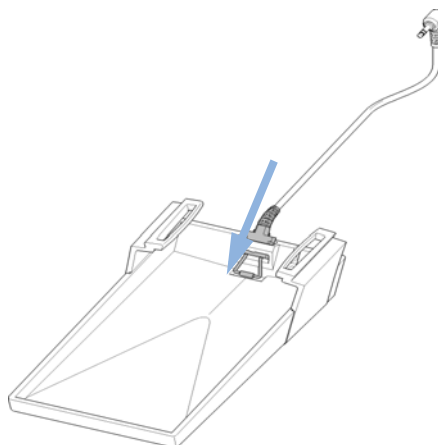
Only connect or disconnect the leak sensor while the valve drive is powered off.

The valve drive must be 'powered off' for at least 10 s to recognize any hardware changes correctly.

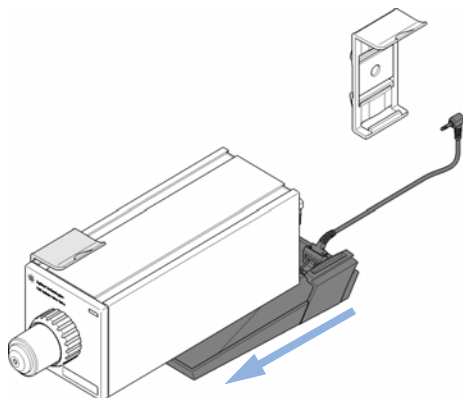
1 Attach the leak tray clamp to the leak tray.



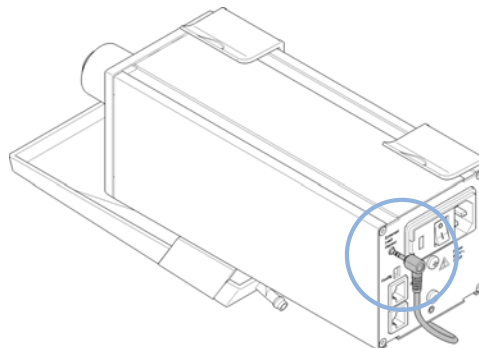
2 Push the leak sensor into its holder.



3 Slide the leak tray onto the bottom of the valve drive.



4 Connect the leak sensor cable to the valve drive.



Mounting the Valve to an Instrument by Using a Valve Rail

CAUTION

"Defective on arrival" problems

If there are signs of damage, please do not attempt to install the module. Inspection by Agilent is required to evaluate if the instrument is in good condition or damaged.

- Notify your Agilent sales and service office about the damage.
- An Agilent service representative will inspect the instrument at your site and initiate appropriate actions.

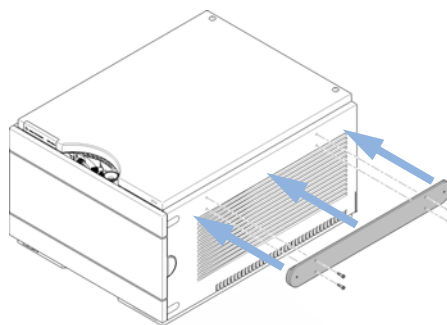
NOTE

The Installation of the leak tray and the external leak sensor is optional.

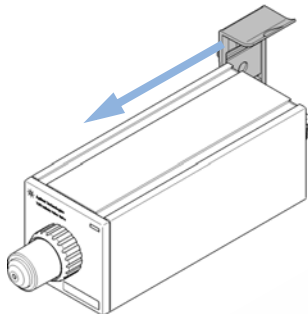
If you want to attach the leak tray to the valve drive you need to slide the leak tray on to the valve drive before having both clamps attached to the valve drive.

1 Ensure the power switch at the rear of the module is OFF and the power connector is unplugged.

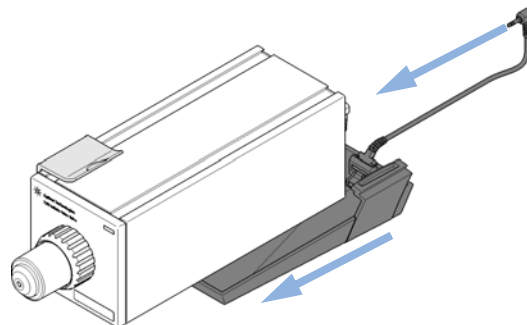
2 Identify the marks for the screws on the side panel of the cabinet assy and screw the valve rail to the side panel of the cabinet.



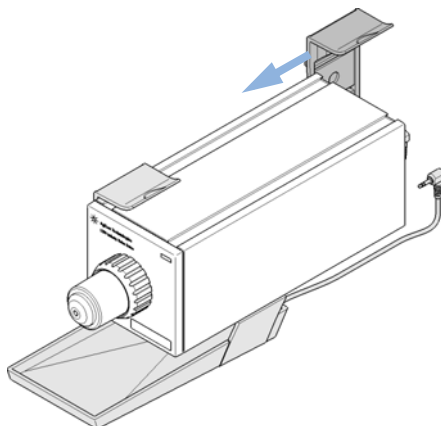
- 3** Slide the first clamp on to one side of the valve drive housing.



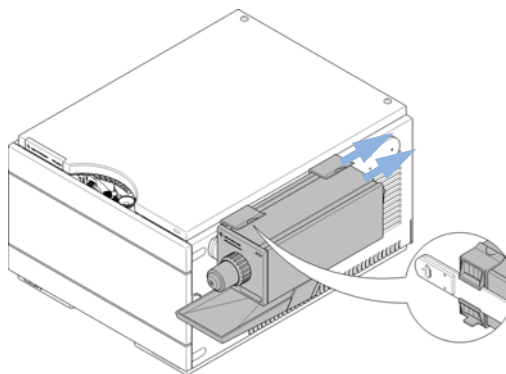
- 4** Optional: Install the leak tray and leak sensor to the valve.



- 5** Slide the second clamp on to the same side as the first one.

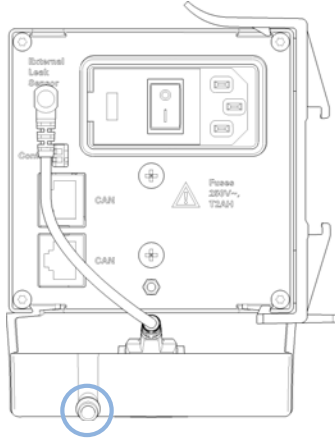


- 6** Slide the valve on to the valve rail.

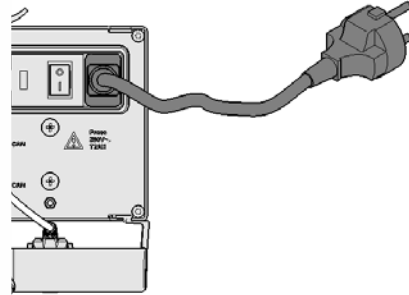


3

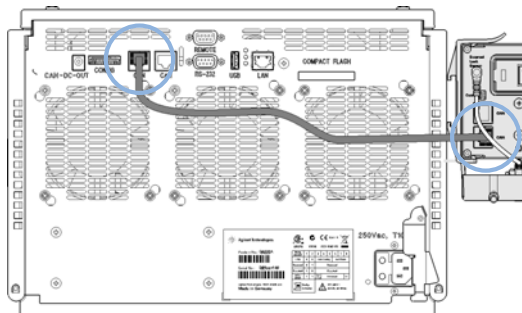
- 7** Attach the waste tubing to the leak plane and guide it to a proper waste container.



- 8** Connect the power cable to the power connector at the rear of the module.



- 9** Connect the CAN interface connection.



- 10** Power on the module by switching the Power button at the rear of the module if a valve head has been already installed. Otherwise continue with 'Installing Valve heads'.

Mounting the Valve to a G1383A Column Organizer

NOTE

For more information about the column organizer read the G1383-90011 Column Organizer Quick Reference Guide

- 1** Attach the column stand mount to the column organizer.
- 2** Attach both clamps to one side of the valve drive.
- 3** Install the leak tray and leak sensor to the valve.
- 4** Slide the valve onto the column stand mount.
- 5** Attach the waste tubing to the leak plane and guide it to a proper waste container.
- 6** Connect the power cable to the power connector at the rear of the module.
- 7** Connect the CAN interface connection to one of the CAN ports at the rear of the module.
- 8** Power on the module by switching the Power button at the rear of the module if a valve head has been already installed. Otherwise continue with 'Installing Valve heads.

Installing the Valve Heads

The valve drives are factory-installed in the thermostatted column compartment and in the 1290 infinity valve drive. The valve heads are interchangeable and can be easily mounted.

At the first installation, the transportation lock (TCC only) and the dummy valve have to be removed, see [“Removing the Transportation Lock and the Valve Dummy”](#) on page 43. The valve heads can be installed by mounting the valve heads onto the valve drives and fastening the nut manually (do not use any tools).

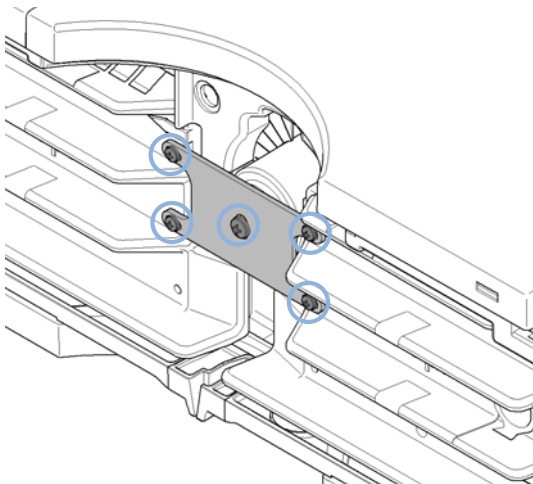
Be sure that the guide pin snaps into the groove of the valve drive thread. The valves are mounted on pull-out rails to allow easy installation of capillaries. Push the valve gently into its housing until it snaps into the inner position, push it again and it slides out. If all capillaries are installed, push the valve back into its housing, see [“Installing the Valve Head and Connecting Capillaries”](#) on page 44.

Removing the Transportation Lock and the Valve Dummy

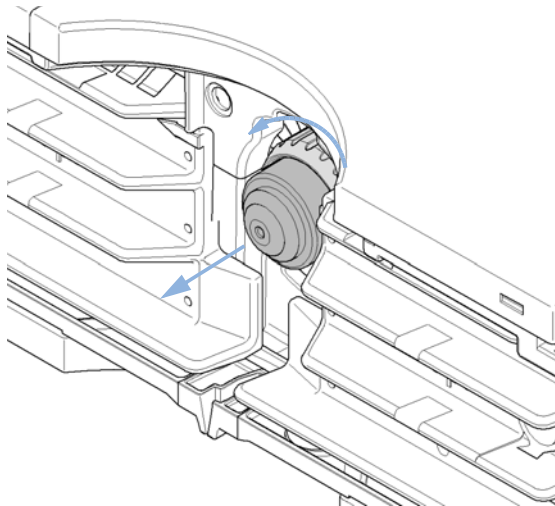
The following procedure demonstrates the necessary steps for installing the valve head to the valve drive of a TCC.

For the installation of a valve head to a G1170A Infinity Valve Drive you can ignore the steps that describe the TCC features of the transportation lock and spring loaded valve drive.

- 1** When unscrewing the transportation lock (TCC only), push it back until the last screw is removed - the valve rail is spring-loaded



- 2** To remove the valve dummy, loosen the nut manually.



Installing the Valve Head and Connecting Capillaries



For bio-inert modules use bio-inert parts only!

CAUTION

The valve actuator contains sensitive optical parts, which need to be protected from dust and other pollutions. Pollution of these parts can impair the accurate selection of valve ports and therefore bias measurement results.

- Always install a valve head for operation and storage. For protecting the actuator, a dummy valve head (part of Transportation Lock Kit (p/n G1316-67001)) can be used instead of a functional valve. Do not touch parts inside the actuator.

CAUTION

Column Damage or Bias Measurement Results

Switching the valve to a wrong position can damage the column or bias measurement results.

- Fit the lobe to the groove to make sure the valve is switched to the correct position.

CAUTION

Valve Damage

Using a low pressure valve on the high pressure side can damage the valve.

- When using multiple column compartments as part of a method development solution, make sure that the high pressure valve head is connected to the autosampler and the low pressure valve head is connected to the detector.

CAUTION

Sample degradation and contamination of the instrument

Metal parts in the flow path can interact with the bio-molecules in the sample leading to sample degradation and contamination.

- For bio-inert applications, always use dedicated bio-inert parts, which can be identified by the bio-inert symbol or other markers described in this manual.
- Do not mix bio-inert and non-inert modules or parts in a bio-inert system.

NOTE

The tag reader reads the valve head properties from the valve head RFID tag during initialization of the module. Valve properties will not be updated, if the valve head is replaced while the module is on. Selection of valve port positions can fail, if the instrument does not know the properties of the installed valve.

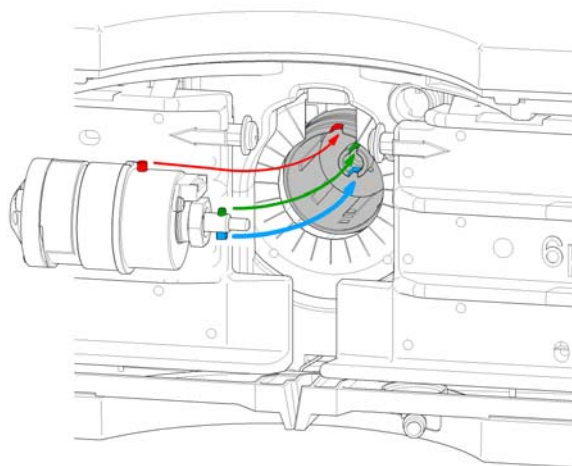
NOTE

To have the valve correctly recognized by the Agilent Infinity valve drive you must have the valve drive powered off for at least 10 s.

3 Installing the Module

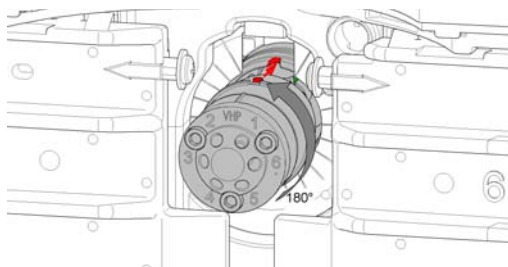
Installing the Valve Heads

- 1** The two different pins (blue & green) on the valve shaft must fit into the corresponding grooves of the actuator axis. The outside pin (red) must fit into the outside groove.

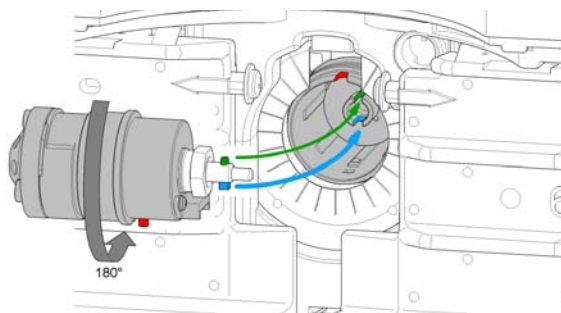


2

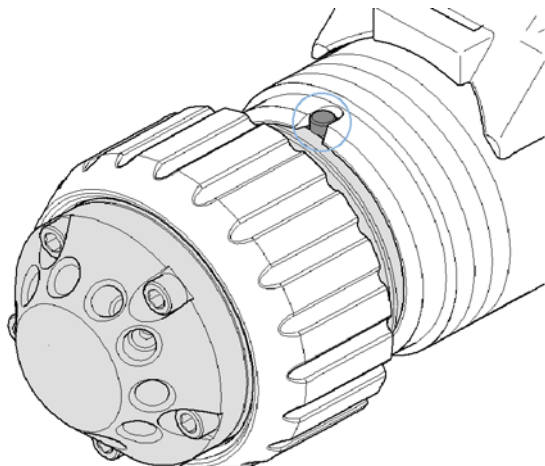
- a** It can be possible that you have to turn the valve head until the outside pin completely locks in. While turning the valve you should feel some resistance from the drive. Otherwise the pins on the valve shaft are not properly fitted into the corresponding adapters on the valve drive.



- b** It can be possible that you have to turn the valve head until the outside pin completely locks in. While turning the valve you should feel some resistance from the drive. Otherwise the pins on the valve shaft are not properly fitted into the corresponding adapters on the valve drive.



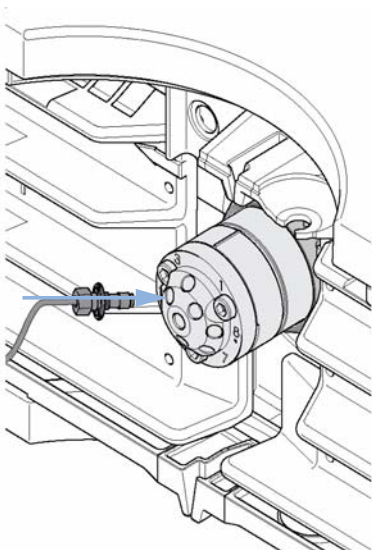
- 3** When the outer pin is locked into the groove, manually screw the nut onto the valve head.



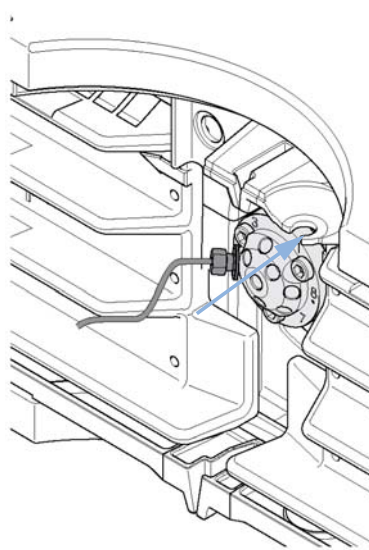
NOTE

Fasten the nut manually. Do not use any tools.

- 4** Install all required capillary connections to the valve.



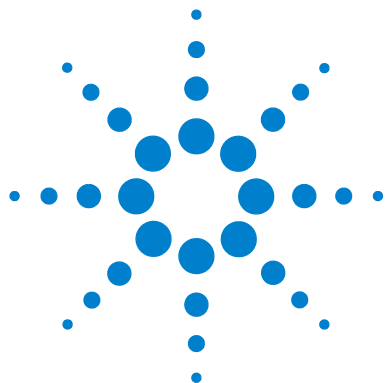
- 5** Push the valve head until it snaps in and stays in the rear position. (TCC only)



- 6** Power on or power-cycle your TCC or Infinity valve drive that the valve head gets recognized during the module initialization.

3 **Installing the Module**

Installing the Valve Heads



4 Using the Module

Hints for Successful Use 50

Solvent Information 52

Software Configuration 57

This chapter explains the operational parameters of the module.



Hints for Successful Use

The presence of algae in HPLC systems can cause a variety of problems that may be incorrectly diagnosed as instrument or application problems. Algae grow in aqueous media, preferably in a pH range of 4-8. Their growth is accelerated by buffers, for example phosphate or acetate. Since algae grow through photosynthesis, light will also stimulate their growth. Even in distilled water small-sized algae grow after some time.

Instrumental Problems Associated With Algae

Algae deposit and grow everywhere within the HPLC system causing:

- Blocked solvent filters or deposits on inlet or outlet valves resulting in unstable flow, composition or gradient problems or a complete failure of the pump.
- Small pore high pressure solvent filters, usually placed before the injector to plug resulting in high system pressure.
- PTFE frits blockage leading to increased system pressure.
- Column filters to plug giving high system pressure.
- Flow cell windows of detectors to become dirty resulting in higher noise levels (since the detector is the last module in the flow path, this problem is less common).

Symptoms Observed with the Agilent 1260 Infinity HPLC

The presence of algae in the Agilent 1260 Infinity can cause the following to occur:

- Increased system pressure caused by clogging of the inline filter. Algae deposits are barely visible on the stainless steel filter frit. Replace the frit if the backpressure of the pump in purge mode (water, 2.5 mL/min) exceeds 20 bar.
- Short lifetime of solvent filters (bottle head assembly). A blocked solvent filter in the bottle, especially when only partly blocked, is more difficult to identify and may show up as gradient performance problems, intermittent pressure fluctuations etc.
- Algae growth may also be the possible source for failures of the ball valves and other components in the flow path.

Solvent Information

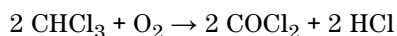
Observe the following recommendations on the use of solvents.

- Follow recommendations for avoiding the growth of algae, see pump manuals.
- Small particles can permanently block capillaries and valves. Therefore, always filter solvents through 0.4 µm filters.
- Avoid or minimize the use of solvents that may corrode parts in the flow path. Consider specifications for the pH range given for different materials like flow cells, valve materials etc. and recommendations in subsequent sections.

Solvent compatibility for stainless steel in standard LC systems

Stainless steel is inert against many common solvents. It is stable in the presence of acids and bases in the pH range specified for standard HPLC (pH 1 – 12.5). It can be corroded by acids below pH 2.3 . In general following solvents may cause corrosion and should be avoided with stainless steel:

- Solutions of alkali halides, their respective acids (for example, lithium iodide, potassium chloride, and so on) and aqueous solutions of halogenes
- High concentrations of inorganic acids like nitric acid, sulfuric acid and organic solvents especially at higher temperatures (replace, if your chromatography method allows, by phosphoric acid or phosphate buffer which are less corrosive against stainless steel).
- Halogenated solvents or mixtures which form radicals and/or acids, for example:



This reaction, in which stainless steel probably acts as a catalyst, occurs quickly with dried chloroform if the drying process removes the stabilizing alcohol.

- Chromatographic grade ethers, which can contain peroxides (for example, THF, dioxane, di-isopropylether) such ethers should be filtered through dry aluminium oxide which adsorbs the peroxides.
- Solutions of organic acids (acetic acid, formic acid, and so on) in organic solvents. For example, a 1 % solution of acetic acid in methanol will attack steel.
- Solutions containing strong complexing agents (for example, EDTA, ethylene diamine tetra-acetic acid).
- Mixtures of carbon tetrachloride with 2-propanol or THF.

Solvent information for parts of the 1260 Infinity Bio-inert LC system

For the Agilent 1260 Infinity Bio-inert LC system, Agilent Technologies uses highest quality materials (see “[Bio-inert Materials](#)” on page 21) in the flow path (also referred to as wetted parts), which are widely accepted by life scientists, as they are known for optimum inertness to biological samples, and ensure best compatibility to common samples and solvents over a wide pH range. Explicitly, the complete flow path is free from stainless steel and free from other alloys containing metals such as iron, nickel, cobalt, chromium, molybdenum or copper, which can interfere with biological samples. The flow downstream of the sample introduction contains no metals whatsoever.

However, there are no materials that combine suitability for versatile HPLC instrumentation (valves, capillaries, springs, pump heads, flow cells etc.) with complete compatibility with all possible chemicals and application conditions. This section recommends the preferred solvents. Chemicals that are known to cause issues should be avoided, or exposure should be minimized, for example, for short-term cleaning procedures. After potentially aggressive chemicals have been used, the system should be flushed with compatible standard HPLC solvents.

PEEK

PEEK (Polyether-Ether Ketones) combines excellent properties with regard to biocompatibility, chemical resistance, mechanical and thermal stability and is therefore the material of choice for biochemical instrumentation. It is stable in the specified pH range, and inert to many common solvents. There is still a number of known incompatibilities with chemicals such as chloroform, methylene chloride, THF, DMSO, strong acids (nitric acid > 10 %, sulphuric acid > 10 %, sulfonic acids, trichloroacetic acid), halogenes or aqueous halogene solutions, phenol and derivatives (cresols, salicylic acid etc.).

When used above room temperature, PEEK is sensitive to bases and various organic solvents, which can cause it to swell. As normal PEEK capillaries are very sensitive to high pressure, especially under such conditions, Agilent uses stainless-steel clad PEEK capillaries to keep the flow path free of steel and to ensure pressure stability to at least 600 bar. If in doubt, consult the available literature about the chemical compatibility of PEEK.

Titanium

Titanium is highly resistant to oxidizing acids (for example, nitric, perchloric and hypochlorous acid) over a wide range of concentrations and temperatures. This is due to a thin oxide layer on the surface, which is stabilized by oxidizing compounds. Reducing acids (for example, hydrochloric, sulfuric and phosphoric acid) can cause slight corrosion, which increases with acid concentration and temperature. For example, the corrosion rate with 3 % HCl (about pH 0.1) at room temperature is about 13 $\mu\text{m}/\text{year}$. At room temperature, titanium is resistant to concentrations of about 5 % sulfuric acid (about pH 0.3). The addition of nitric acid to hydrochloric or sulfuric acids significantly reduces corrosion rates. Titanium is subject to corrosion in anhydrous methanol, which can be avoided by adding a small amount of water (about 3 %). Slight corrosion is possible with ammonia > 10 %.

Fused silica

Fused silica is inert against all common solvents and acids except hydrofluoric acid. It is corroded by strong bases and should not be used above pH 12 at room temperature. The corrosion of flow cell windows can negatively affect measurement results. For a pH greater than 12, the use of flow cells with sapphire windows is recommended.

Gold

Gold is inert to all common HPLC solvents, acids and bases within the specified pH range. It can be corroded by complexing cyanides and concentrated acids like aqua regia (a mixture of concentrated hydrochloric and nitric acid).

Zirconium Oxide

Zirconium Oxide (ZrO_2) is inert to almost all common acids, bases and solvents. There are no documented incompatibilities for HPLC applications.

Platinum/Iridium

Platinum/Iridium is inert to almost all common acids, bases and solvents. There are no documented incompatibilities for HPLC applications.

PTFE

PTFE (polytetrafluorethen) is inert to almost all common acids, bases and solvents. There are no documented incompatibilities for HPLC applications.

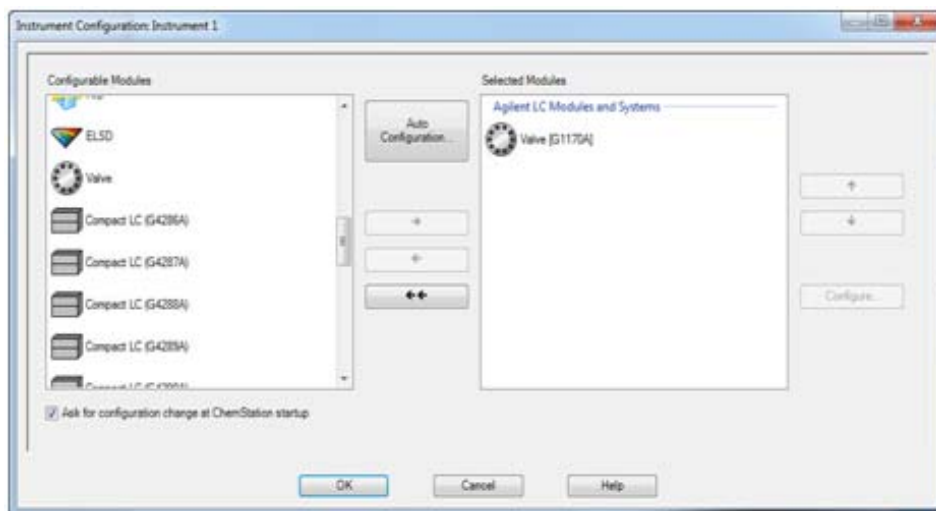
Sapphire, Ruby and Al₂O₃-based ceramics

Sapphire, ruby and ceramics based on Al₂O₃ are inert to almost all common acids, bases and solvents. There are no documented incompatibilities for HPLC applications.

Data above were collected from external resources and are meant as a reference. Agilent cannot guarantee the completeness and correctness of such information. Information can also not be generalized due to catalytic effects of impurities like metal ions, complexing agents, oxygen etc. Most data available refers to room temperature (typically 20 – 25 °C, 68 – 77 °F). If corrosion is possible, it usually increases at higher temperatures. If in doubt, consult additional resources.

Software Configuration

Configuring the Valves in the Software

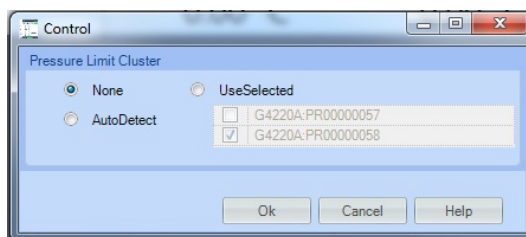


- 1 Configure your instrument by choosing between available modules.
- 2 Choose your valve drive(s) from the list of 'Configurable modules'(auto or manual configuration).

NOTE

A valve head needs to be detected from the module before you can configure it in the software. Please refer to the 'Installation of the valve heads' chapter for details.

Assign a Pressure Limit Cluster to the Valve



The valve head's RFID Tag holds the information about its max. pressure. An assigned pressure cluster partner assures that this limit gets not exceeded. The max. pressure information of the valve head will become the new maximum pressure setting of the assigned pressure cluster partner. This helps to avoid damage to the valve head if the max. pressure of the pump is higher than the valve head's maximum pressure.

- 1 Open the valve's control menu (right click on the valve's GUI or via the Instrument Tab).
- 2 Assign the valve's pressure partner (also 'None' or several partners possible).

NOTE

Assigning a Pressure Limit Cluster only works in combination with a 1290 Series Infinity Binary Pump G4220A/B

Possible Method Settings for the Valve

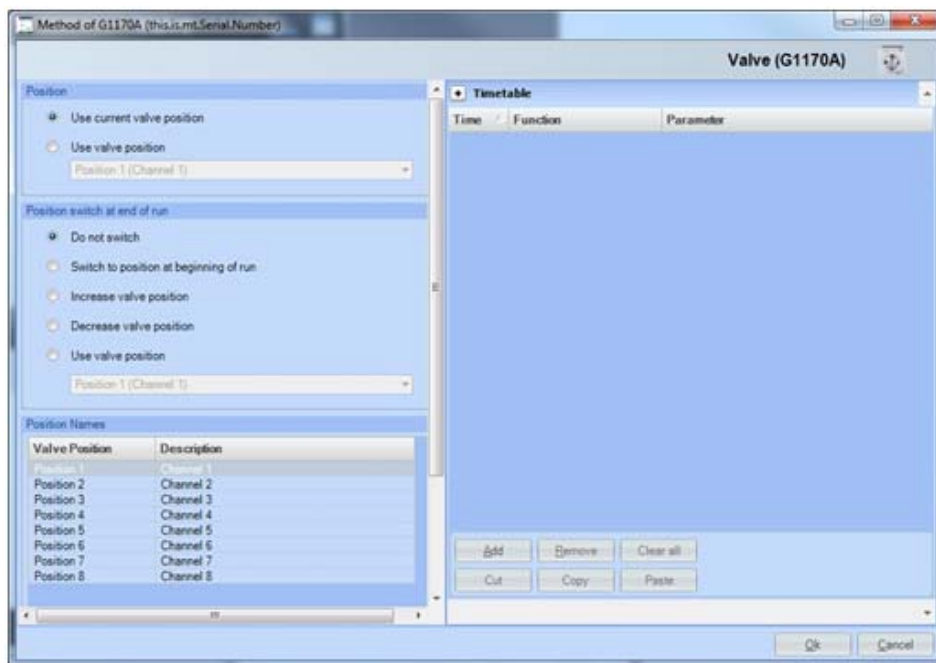


Figure 9 Method settings of the Valve

After the Agilent 1290 Series Valves have been installed and configured, the valve parameters can be edited in the software. Choose Method by right clicking on the the valve's GUI icon or via 'Edit entire method' under the menu to open the valve dialog box as displayed [Figure 9](#) on page 59.

Position

When loading a method the valve is switched to the position that is displayed in the Position dropdown box. If you select Use Current, the valve remains in the current position, when a new method is loaded.

If you select a new position in the dropdown box and click OK, the Setup Valve dialog box will be closed and the valve switches to the new position.

Position switch at end of run

Gives you the possibility to define a position the valve is switched to at the end of the run.

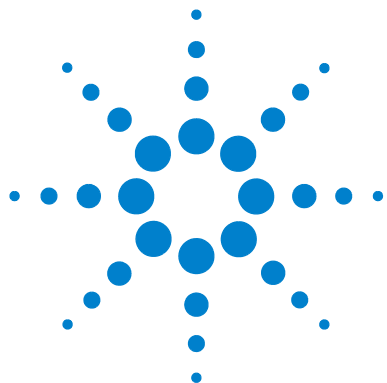
Position Names

Define the Position Names that is used for the method report and the instrument actuals. The Position Description is limited to 19 characters.

Time Table

The Time Table can be used to edit and run a valve program during a sequence of sample runs. The Time Table contains 3 columns (Line, Time and Position). The Time Table is limited to 20 lines. The number of selection in the Position column depends on the valve that has been configured.

Position X	Switches the valve to the selected position.
Next Position	Switches to the next available position. If the valve is on the highest position it will switch to position 1.
Insert	Inserts a line in the Time Table above the selected position.
Append	Appends a line at the end of the Time Table.
Cut	Cuts the selected line(s) out of the Time Table and saves it to the clipboard.
Copy	Copies the selected line(s) from the table to the clipboard.
Paste	Pastes line(s) from the Clipboard to the Time Table.



5 Troubleshooting and Diagnostics

Overview of the Module's Indicators and Test Functions 62

Module Status Indicator 63

Agilent Lab Advisor Software 64

This chapter gives an overview about the troubleshooting and diagnostic features and the different user interfaces.



Overview of the Module's Indicators and Test Functions

Status Indicators

The module is provided with two status indicators which indicate the operational state (prerun, run, and error states) of the module. The status indicators provide a quick visual check of the operation of the module.

Error Messages

In the event of an electronic, mechanical or hydraulic failure, the module generates an error message in the user interface. For each message, a short description of the failure, a list of probable causes of the problem, and a list of suggested actions to fix the problem are provided (see chapter Error Information).

Test Functions

A series of test functions are available via the Lab Advisor Software for troubleshooting and operational verification.

Module Status Indicator

The module status indicator indicates one of six possible module conditions:

- When the status indicator is *OFF* (and power switch light is on), the module is in a *prerun* condition, and is ready to begin an analysis.
- A *green* status indicator, indicates the module is performing an analysis (*run* mode).
- A *yellow* indicator indicates a *not-ready* condition. The module is in a not-ready state when it is waiting for a specific condition to be reached or completed (for example, immediately after changing a set point), or while a self-test procedure is running.
- An *error* condition is indicated when the status indicator is *red*. An error condition indicates the module has detected an internal problem which affects correct operation of the module. Usually, an error condition requires attention (e.g. leak, defective internal components). An error condition always interrupts the analysis.

If the error occurs during analysis, it is propagated within the LC system, i.e. a red LED may indicate a problem of a different module. Use the status display of your user interface for finding the root cause/module of the error.

- A *blinking* indicator indicates that the module is in resident mode (e.g. during update of main firmware).
- A *fast blinking* indicator indicates that the module is in a low-level error mode. In such a case try to re-boot the module or try a cold-start (see [“Config Switch Settings of the Infinity Valve Drive”](#) on page 144). Then try a firmware update (see [“Replacing the Module Firmware”](#) on page 90). If this does not help, a main board replacement is required.

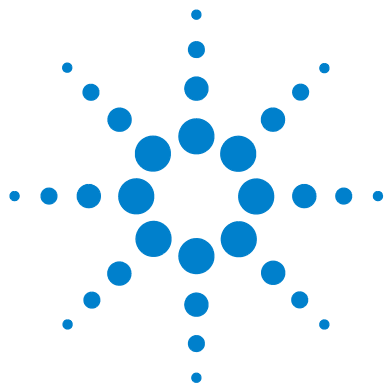
Agilent Lab Advisor Software

The Agilent Lab Advisor software is a standalone product that can be used with or without data system. Agilent Lab Advisor software helps to manage the lab for high quality chromatographic results and can monitor in real time a single Agilent LC or all the Agilent GCs and LCs configured on the lab intranet.

Agilent Lab Advisor software provides diagnostic capabilities for all Agilent 1200 Infinity Series modules. This includes diagnostic capabilities, calibration procedures and maintenance routines for all the maintenance routines.

The Agilent Lab Advisor software also allows users to monitor the status of their LC instruments. The Early Maintenance Feedback (EMF) feature helps to carry out preventive maintenance. In addition, users can generate a status report for each individual LC instrument. The tests and diagnostic features as provided by the Agilent Lab Advisor software may differ from the descriptions in this manual. For details refer to the Agilent Lab Advisor software help files.

The Instrument Utilities is a basic version of the Lab Advisor with limited functionality required for installation, use and maintenance. No advanced repair, troubleshooting and monitoring functionality is included.



6 Error Information

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This chapter describes the meaning of error messages, and provides information on probable causes and suggested actions how to recover from error conditions.



What Are Error Messages

Error messages are displayed in the user interface when an electronic, mechanical, or hydraulic (flow path) failure occurs which requires attention before the analysis can be continued (for example, repair, or exchange of consumables is necessary). In the event of such a failure, the red status indicator at the front of the module is switched on, and an entry is written into the module logbook.

General Error Messages

General error messages are generic to all Agilent series HPLC modules and may show up on other modules as well.

Timeout

Error ID: 0062

The timeout threshold was exceeded.

Probable cause

- 1 The analysis was completed successfully, and the timeout function switched off the module as requested.
- 2 A not-ready condition was present during a sequence or multiple-injection run for a period longer than the timeout threshold.

Suggested actions

Check the logbook for the occurrence and source of a not-ready condition. Restart the analysis where required.

Check the logbook for the occurrence and source of a not-ready condition. Restart the analysis where required.

Shutdown

Error ID: 0063

An external instrument has generated a shutdown signal on the remote line.

The module continually monitors the remote input connectors for status signals. A LOW signal input on pin 4 of the remote connector generates the error message.

Probable cause

- 1 Leak detected in another module with a CAN connection to the system.
- 2 Leak detected in an external instrument with a remote connection to the system.
- 3 Shut-down in an external instrument with a remote connection to the system.

Suggested actions

- Fix the leak in the external instrument before restarting the module.
- Fix the leak in the external instrument before restarting the module.
- Check external instruments for a shut-down condition.

Remote Timeout

Error ID: 0070

A not-ready condition is still present on the remote input. When an analysis is started, the system expects all not-ready conditions (for example, a not-ready condition during detector balance) to switch to run conditions within one minute of starting the analysis. If a not-ready condition is still present on the remote line after one minute the error message is generated.

Probable cause

- 1 Not-ready condition in one of the instruments connected to the remote line.
- 2 Defective remote cable.
- 3 Defective components in the instrument showing the not-ready condition.

Suggested actions

- Ensure the instrument showing the not-ready condition is installed correctly, and is set up correctly for analysis.
- Exchange the remote cable.
- Check the instrument for defects (refer to the instrument's documentation).

Lost CAN Partner

Error ID: 0071

During an analysis, the internal synchronization or communication between one or more of the modules in the system has failed.

The system processors continually monitor the system configuration. If one or more of the modules is no longer recognized as being connected to the system, the error message is generated.

Probable cause

- 1 CAN cable disconnected.
- 2 Defective CAN cable.
- 3 Defective main board in another module.

Suggested actions

- Ensure all the CAN cables are connected correctly.
 - Ensure all CAN cables are installed correctly.
- Exchange the CAN cable.
- Switch off the system. Restart the system, and determine which module or modules are not recognized by the system.

Leak Sensor Short

Error ID: 0082

The leak sensor in the module has failed (short circuit).

The current through the leak sensor is dependent on temperature. A leak is detected when solvent cools the leak sensor, causing the leak sensor current to change within defined limits. If the current increases above the upper limit, the error message is generated.

Probable cause

- 1 Defective leak sensor.
- 2 Leak sensor incorrectly routed, being pinched by a metal component.

Suggested actions

- Please contact your Agilent service representative.
- Please contact your Agilent service representative.

Leak Sensor Open

Error ID: 0083

The leak sensor in the module has failed (open circuit).

The current through the leak sensor is dependent on temperature. A leak is detected when solvent cools the leak sensor, causing the leak-sensor current to change within defined limits. If the current falls outside the lower limit, the error message is generated.

Probable cause

- 1 Leak sensor not connected to the main board.
- 2 Defective leak sensor.
- 3 Leak sensor incorrectly routed, being pinched by a metal component.

Suggested actions

Please contact your Agilent service representative.

Please contact your Agilent service representative.

Please contact your Agilent service representative.

Compensation Sensor Open

Error ID: 0081

The ambient-compensation sensor (NTC) on the main board in the module has failed (open circuit).

The resistance across the temperature compensation sensor (NTC) on the main board is dependent on ambient temperature. The change in resistance is used by the leak circuit to compensate for ambient temperature changes. If the resistance across the sensor increases above the upper limit, the error message is generated.

Probable cause

- 1 Defective main board.

Suggested actions

Please contact your Agilent service representative.

Compensation Sensor Short

Error ID: 0080

The ambient-compensation sensor (NTC) on the main board in the module has failed (short circuit).

The resistance across the temperature compensation sensor (NTC) on the main board is dependent on ambient temperature. The change in resistance is used by the leak circuit to compensate for ambient temperature changes. If the resistance across the sensor falls below the lower limit, the error message is generated.

Probable cause

- 1 Defective main board.

Suggested actions

Please contact your Agilent service representative.

Leak

Error ID: 0064

A leak was detected in the module.

The signals from the two temperature sensors (leak sensor and board-mounted temperature-compensation sensor) are used by the leak algorithm to determine whether a leak is present. When a leak occurs, the leak sensor is cooled by the solvent. This changes the resistance of the leak sensor which is sensed by the leak-sensor circuit on the main board.

Probable cause

- 1 Loose fittings.
- 2 Broken capillary.

Suggested actions

Ensure all fittings are tight.
Exchange defective capillaries.

Module Specific Error Messages

Initialization of Valve Failed

Error ID: 24000

During the initialization process the motor of the valve drive moves to some special positions depending on the installed valve head. A failure in this process means either that the movement couldn't be performed properly or it was not noticed correctly by the sensor.

Probable cause

- 1** Mechanical problems. Friction too high or blockages on the valve drive's motor or on the valve head.
- 2** Defect Sensor on the Valve Drive Motor

Suggested actions

- Check valve head for correct installation
- Try to identify the source of trouble by installing a different valve head if possible.
- Contact your Agilent Service representative.
- Check valve head for correct installation
- Try to identify the source of trouble by installing a different valve head if possible.
- Contact your Agilent Service representative.

Initialization of Valve Failed

Error ID: 24001

The valve drive was not able to operate the valve head correctly. Either due to mechanical reasons or the movement couldn't be detected correctly.

Probable cause

- 1 Mechanical problems. Friction too high or blockages on the valve drive's motor or on the valve head.
- 2 Defect Sensor on the Valve Drive Motor

Suggested actions

- Check valve head for correct installation
- Try to identify the source of trouble by installing a different valve head if possible.
- Contact your Agilent Service representative.
- Check valve head for correct installation
- Try to identify the source of trouble by installing a different valve head if possible.
- Contact your Agilent Service representative.

Valve Tag Violation

Error ID: 24006

The valve drive identified a different valve head than it had identified during the last initialization.

Probable cause

- 1 A valve head has been exchanged (hot-plugged) while the valve drive was still powered on.

Suggested actions

For changing the valve head follow the instructions [“Replacing Valve Heads”](#) on page 86. It is important to have the valve switched off for at least 10 s after or before a new valve head has been installed.

NOTE

Soft power-down power supply of the valve drive.
Whenever you want to power cycle the valve drive for a re-boot, it needs to be powered off for at least 10 seconds.

Pressure Cluster Partner Missing

The connection from the valve drive to a defined pressure cluster partner is lost.

Probable cause

- 1 Communication issues
- 2 Configuration mismatch

Suggested actions

Check the CAN cable connections of the modules.

Check and correct if necessary the valve configuration and presence of defined pressure cluster partner.

Position Cluster Partner Missing

Probable cause

- 1 Communication issues
- 2 Configuration mismatch

Suggested actions

Check the CAN cable connections of the modules.

Check and correct if necessary the valve configuration and presence of defined position cluster partner.



7 Maintenance

Introduction to Maintenance	76
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Replacing Parts of the Valve Head	81
Replacing the Fuses of the Infinity Valve Drive	83
Replacing Valve Heads	86
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This chapter gives you an overview and instructions about the possible maintenance and repair procedures that can be performed by the user.



Introduction to Maintenance

The module is designed for easy maintenance. The most frequent maintenances such as maintaining valve heads (if optional valve drive is installed) or replacing low dispersion heat exchangers can be done from the front with module in place in the system stack.

NOTE

There are no serviceable parts inside.

Do not open the module.

Cautions and Warnings

WARNING

Toxic, flammable and hazardous solvents, samples and reagents

The handling of solvents, samples and reagents can hold health and safety risks.

- When working with these substances observe appropriate safety procedures (for example by wearing goggles, safety gloves and protective clothing) as described in the material handling and safety data sheet supplied by the vendor, and follow good laboratory practice.
 - The volume of substances should be reduced to the minimum required for the analysis.
 - Do not operate the instrument in an explosive atmosphere.
-

WARNING

Electrical shock

Repair work at the module can lead to personal injuries, e.g. shock hazard, when the cover is opened.

- Do not remove the cover of the module.
 - Only certified persons are authorized to carry out repairs inside the module.
-

WARNING

Personal injury or damage to the product

Agilent is not responsible for any damages caused, in whole or in part, by improper use of the products, unauthorized alterations, adjustments or modifications to the products, failure to comply with procedures in Agilent product user guides, or use of the products in violation of applicable laws, rules or regulations.

- Use your Agilent products only in the manner described in the Agilent product user guides.
-

CAUTION

Safety standards for external equipment

- If you connect external equipment to the instrument, make sure that you only use accessory units tested and approved according to the safety standards appropriate for the type of external equipment.
-

CAUTION

Sample degradation and contamination of the instrument

Metal parts in the flow path can interact with the bio-molecules in the sample leading to sample degradation and contamination.

- For bio-inert applications, always use dedicated bio-inert parts, which can be identified by the bio-inert symbol or other markers described in this manual.
 - Do not mix bio-inert and non-inert modules or parts in a bio-inert system.
-

Overview of Maintenance

The following pages describe maintenance procedures (simple repairs) that can be done without opening the main cover.

Table 7 Maintenance Procedures

Procedure	Typical Frequency	Notes
“Cleaning the Module” on page 80	If required	
“Replacing Parts of the Valve Head” on page 81	If leak sensor is defect	
“Replacing the Fuses of the Infinity Valve Drive” on page 83	When a fuse is defect	
“Replacing Valve Heads” on page 86	If the valve performance shows indication of leakage or wear	
“Replacing the Module Firmware” on page 90	If required	

Cleaning the Module

To keep the module case clean, use a soft cloth slightly dampened with water, or a solution of water and mild detergent.

WARNING

Liquid dripping into the electronic compartment of your module can cause shock hazard and damage the module

- Do not use an excessively damp cloth during cleaning.
 - Drain all solvent lines before opening any connections in the flow path.
-

Replacing Parts of the Valve Head

For details about the needed parts and orientation please refer to “[Parts and Materials](#)” on page 91.

Disassembling and reassembling the valve head



For bio-inert modules use bio-inert parts only!

When	Stator head: Scratches and damages on the inner surface, blockages
	Stator face assy: When visibly scratched, or when the valve performance shows indication of leakage or wear
	Rotor seal assy: After approximately 10000 to 20000 injections, or when the valve performance shows indication of leakage or wear

Tools required	Description
	Hex key

WARNING

Toxic, flammable and hazardous solvents, samples and reagents

The handling of solvents, samples and reagents can hold health and safety risks.

- Be sure that no solvent can drop out of the solvent connections when removing them from your valve head.
- When working with these substances observe appropriate safety procedures (for example by wearing goggles, safety gloves and protective clothing) as described in the material handling and safety data sheet supplied by the vendor, and follow good laboratory practice.

7 Maintenance

Replacing Parts of the Valve Head

- 1 Use the Hex Key to open and remove the Stator Screws from the Stator Head.
- 2 Carefully disassemble the necessary Valve Head parts to gain access to the one you want to replace. While doing so please observe the orientation of the parts.
- 3 Independent of the part you want to replace always inspect all parts for signs of damage.
- 4 Replace the proposed part.

NOTE

Always mind the correct orientation of the parts and avoid to touch their surfaces.

- 5 Turn each of the screws an equal amount until they are finger-tight, then tighten them for another half turn.

Replacing the Fuses of the Infinity Valve Drive

When If the valve drive shows no reaction.

Tools required **Description**
Screwdriver

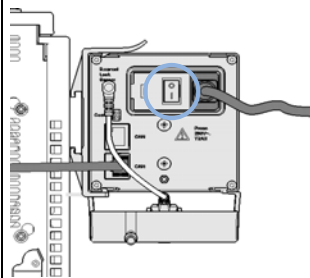
Parts required	#	p/n	Description
	2	2110-1486	Fuse 2 AT250 V

WARNING

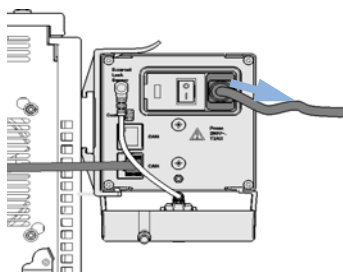
Electrical shock

- Disconnect the valve drive from line power before changing a fuse or trying to open the hatch of the power input socket.
- Never re-connect the line power before having the power input socket closed.

1 Switch off the instrument. The line switch is located at the rear of the valve drive.



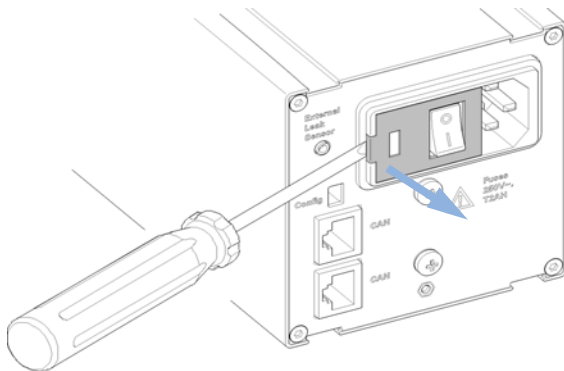
2 Disconnect the power cable from the power input socket.



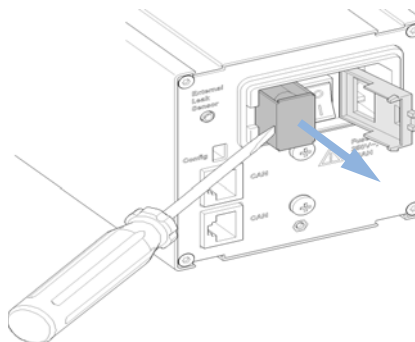
7 Maintenance

Replacing the Fuses of the Infinity Valve Drive

- 3** To access the fuse drawer, gently lift the outer plastic housing of the power inlet socket using a flat screwdriver.

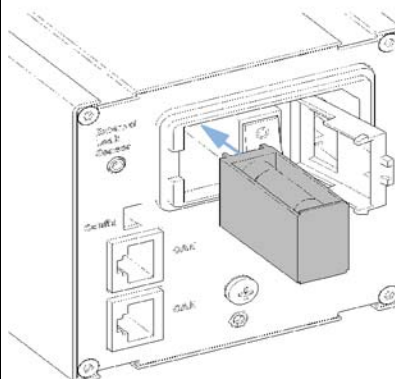


- 4** Pull out the fuse drawer as shown.

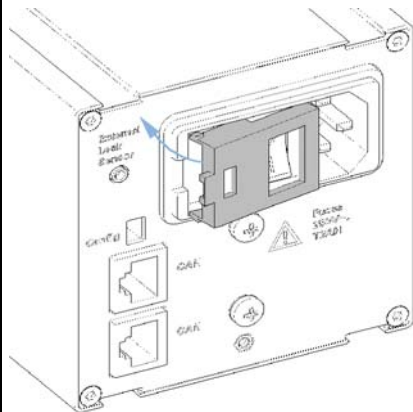


- 5** Replace the defect fuse(s).

- 6** Slide in the fuse drawer and push till it fits tightly.



- 7** Finally, close the fuse drawer housing, reconnect the instrument to the power line and switch it on.



Replacing Valve Heads

Several optional valve heads are available, which can be installed and exchanged easily.

Micro valves offer small internal volumes for minimum peak broadening, ideal for low flow rates in the nl/min and µl/min range.



For bio-inert modules use bio-inert parts only!

Parts required	#	p/n	Description
	1	5067-4121	8 pos/9 port valve head high pressure (1200 bar)
OR	1	5067-4107	Valve Head 8 Position/9 Port, 600 bar
OR	1	5067-4137	Valve Head 2 Position / 6 Port, 600 bar
OR	1	5067-4117	2 pos/6 port ultra high pressure (1200 bar) valve head
OR	1	5067-4144	Micro Valve Head 2 Position / 10 Port, 600 bar
OR	1	5067-4118	2 pos/10 port ultra high pressure (1200 bar) valve head
OR	1	5067-4146	Valve head 6 column selector (600 bar)
OR	1	5067-4142	Valve head 6 column selector (1200 bar)
OR	1	5067-4148	Bio-inert valve head 2 pos/6 port (600 bar)
OR	1	5067-4134	Bio-inert valve head 4 column selector (600 bar)
OR	1	5067-4159	Bio-inert selector valve 12 position/13 port (210 bar)

WARNING

Toxic, flammable and hazardous solvents, samples and reagents

The handling of solvents, samples and reagents can hold health and safety risks.

- Be sure that no solvent can drop out of the solvent connections when removing them from your valve head.
- When working with these substances observe appropriate safety procedures (for example by wearing goggles, safety gloves and protective clothing) as described in the material handling and safety data sheet supplied by the vendor, and follow good laboratory practice.

CAUTION

Valve Damage

Using a low pressure valve on the high pressure side can damage the valve.

- When using multiple column compartments as part of a method development solution, make sure that the high pressure valve head is connected to the autosampler and the low pressure valve head is connected to the detector.

NOTE

For details, please refer to the Agilent 1200 Infinity Series Method Development System - System Manual (p/n G4230-90002).

CAUTION

Column Damage or Bias Measurement Results

Switching the valve to a wrong position can damage the column or bias measurement results.

- Fit the lobe to the groove to make sure the valve is switched to the correct position.

CAUTION

The valve actuator contains sensitive optical parts, which need to be protected from dust and other pollutions. Pollution of these parts can impair the accurate selection of valve ports and therefore bias measurement results.

- Always install a valve head for operation and storage. For protecting the actuator, a dummy valve head (part of Transportation Lock Kit (p/n G1316-67001)) can be used instead of a functional valve. Do not touch parts inside the actuator.

NOTE

The tag reader reads the valve head properties from the valve head RFID tag during initialization of the module. Valve properties will not be updated, if the valve head is replaced while the module is on.

Selection of valve port positions can fail, if the instrument does not know the properties of the installed valve.

NOTE

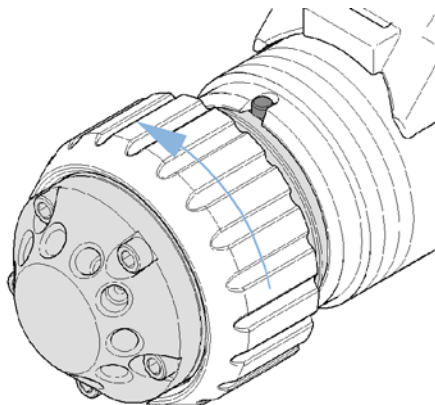
To have the valve correctly recognized by the Agilent Infinity Valve Drive you must have the valve drive powered off for at least 10 seconds.

7 Maintenance

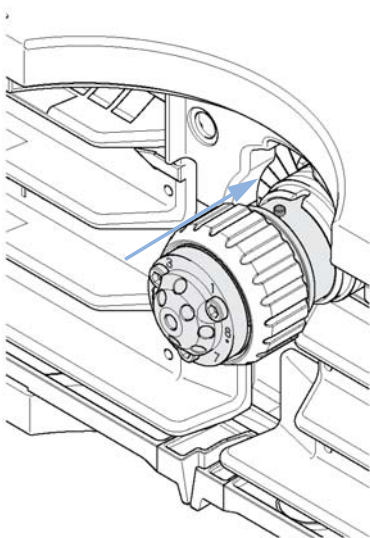
Replacing Valve Heads

- 1 Switch off the module.
- 2 Push the valve head for bringing it to its outer position (TCC only).
- 3 Remove all capillary connections from the valve head

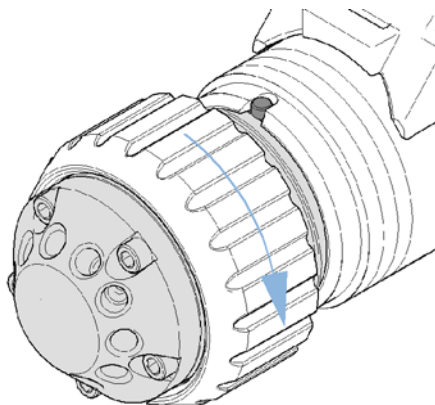
- 4 Unscrew the valve head.



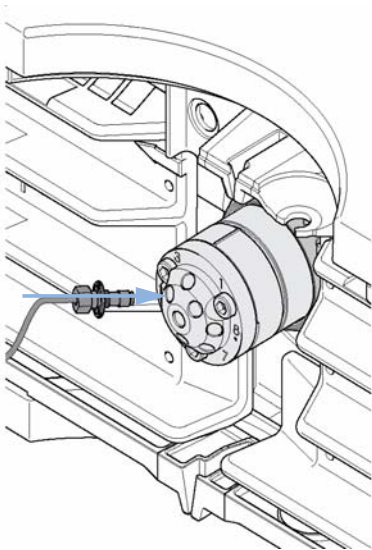
- 5 Put the new valve head onto the valve drive such that the lobe fits to the groove (see also "Installing the Valve Heads" on page 42).



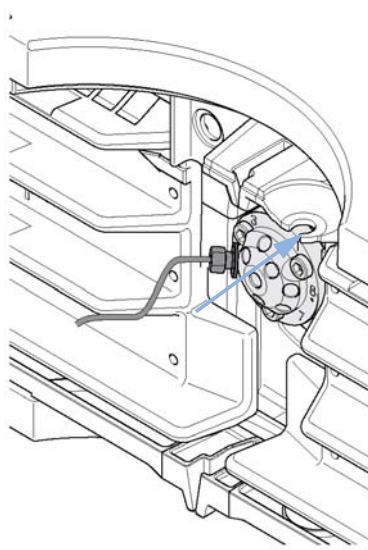
- 6 Screw the valve head onto the valve drive using the union nut (see also "Installing the Valve Heads" on page 42).



7 Install all required capillary connections to the valve head.



8 Push the valve head until it snaps in and stays in the rear position.

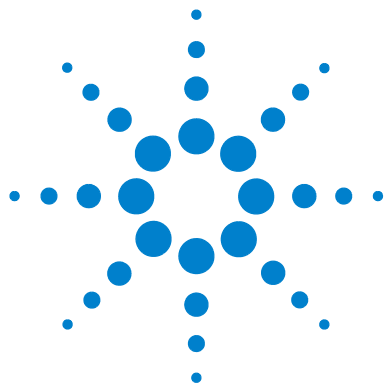


9 Switch on the module.

Replacing the Module Firmware

Table 8 Module Specific Information (G1170A)

Initial firmware (main and resident)	A.06.40
Compatible with 1100/1200 series modules	All other modules must have firmware revision A.06.4x or B.06.4x or above (main and resident). Otherwise the communication will not work.
Conversion to / emulation	N/A



8 Parts and Materials

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2 Pos/6 Port Valve Head 600 bar (Bio-inert)	109
2 Pos/10 Port Micro Valve Head 600 bar	110
2 Pos/10 Port Ultra High Pressure Valve Head 1200 bar	111
8 Pos/9 Port Valve Head 600 bar	112
8 Pos/9 Port Ultra High Pressure Valve Head 1200 bar	113
Valve Head 4 Column Selector 600 bar (Bio-inert)	114
Valve Head 6 Column Selector 600 bar	115
Valve Head 6 Column Selector 1200 bar	116
12 Pos/13 Port Valve Head 210 bar (Bio-inert)	117

This chapter provides information on parts and materials.



Valve Drive Parts

Item	p/n	Description
1	5043-0275	Clamp guide For attaching the valve to a rail assembly
2	5067-4792	Leak sensor assembly External leak sensor
3	5043-0271	Holder leak plane
4	5043-0270	Leak plane
5	5068-0106	Spanner nut
	2110-1486	Fuse 2 AT250 V
6	5067-4634	Valve rail assembly See "Installing the Valve Drive" on page 36
7	5067-1510	Rail assy for column organizer See "Installing the Valve Drive" on page 36

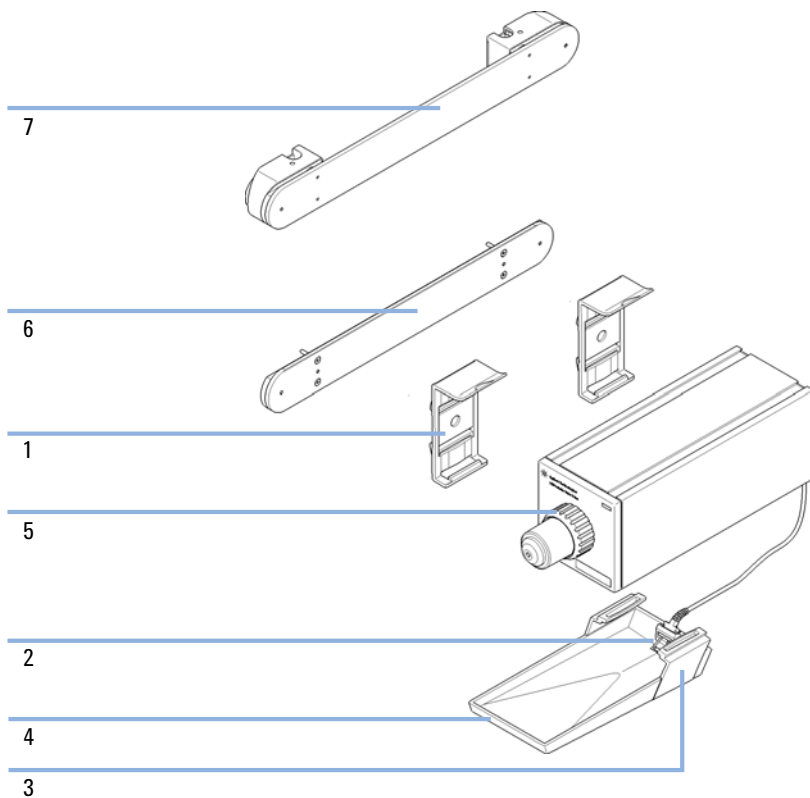


Figure 10 Valve Drive Parts

Valve Options Overview

This overview gives a summary of the main parts and assemblies. More details are available with each valve option in this chapter.

Table 9 Agilent Quick Change Valve Heads

Kit description¹	Valve head	Rotor seal	Stator heads
Method development valves kit (p/n G4230A) ²	Valve Head 8 Position/9 Port, 600 bar (p/n 5067-4107)	Rotor Seal, PEEK (p/n 5067-4111)	Stator head (p/n 5068-0001)
Method development valves kit (p/n G4230B) ²	8 pos/9 port valve head high pressure (1200 bar) (p/n 5067-4121)	Rotor seal (Vespel) (p/n 5068-0002)	Stator head (p/n 5068-0001)
2pos/6port valve (p/n G4231B)	2 pos/6 port ultra high pressure (1200 bar) valve head (p/n 5067-4117)	Rotor seal (Vespel) (p/n 5068-0008)	Stator head (p/n 5068-0006)
2pos/6port valve (p/n G4231A)	Valve Head 2 Position / 6 Port, 600 bar (p/n 5067-4137)	Rotor Seal, PEEK (p/n 0101-1409)	Stator head (p/n 0101-1417)
2pos/10port valve (p/n G4232B)	2 pos/10 port ultra high pressure (1200 bar) valve head (p/n 5067-4118)	Rotor seal (Vespel) (p/n 5068-0012)	Stator head (p/n 5068-0011)
2pos/10port valve (p/n G4232A)	Micro Valve Head 2 Position / 10 Port, 600 bar (p/n 5067-4144)	Rotor Seal, PEEK (p/n 0101-1415)	Stator Head (p/n 0101-1421)

Table 9 Agilent Quick Change Valve Heads

Kit description ¹	Valve head	Rotor seal	Stator heads
6 column selector valve (p/n G4234A)	Valve head 6 column selector (600 bar) (p/n 5067-4146)	Rotor seal, PEEK (p/n 5068-0076)	Stator Head (p/n 5068-0077)
6 column selector (p/n G4234B)	Valve head 6 column selector (1200 bar) (p/n 5067-4142)	Rotor seal (Vespel) (p/n 5068-0067)	Stator Head (p/n 5068-0077)

¹ Valve kits include the valve head, optional capillary kits, manual, access material and installation and familiarization service. For more details refer to the 'Parts and Material' section.

² G4230A includes 2 x 8Pos/9Port 600bar valve heads. G4230B includes 1x 8Pos/9Port 600bar and 1x 8Pos/9Port 1200bar valve head.

Table 10 Agilent Quick Change Valve heads (Bio-inert)

Kit description	Valve head	Rotor seal	Stator heads
2pos/6port valve, bio-inert (p/n G5631A)	Bio-inert valve head 2 pos/6 port (600 bar) (p/n 5067-4148)		
12pos/13port valve, bio-inert (p/n G4235A)	Bio-inert selector valve 12 position/13 port (210 bar) (p/n 5067-4159)	Bio-inert rotor seal and stator face kit (p/n 0101-1288)	Bio-inert stator head (p/n 5068-0097) ¹
6 column selector valve, bio-inert (p/n G5639A)	Bio-inert valve head 4 column selector (600 bar) (p/n 5067-4134)	Bio-inert rotor seal, PEEK (p/n 5068-0045)	Bio-inert stator head (p/n 5068-0044)

¹ kit with stator face and rotor seal

Accessory Kit

Accessory Kit (p/n G1170-68705)

p/n	Description
5043-0270	Leak plane
5043-0271	Holder leak plane
5067-4792	Leak sensor assembly
5181-1519	CAN cable, Agilent module to module, 1 m
5043-0275 (2x)	Clamp guide
2110-1486 (2x)	Fuse 2 AT250 V

Valve Products

Valve kit P/N	Valve-type	Valve P/N	Supported Fitting size	Capillary Kits ID 0.12 mm	Capillary Kits ID 0.17 mm
G4230A	8pos/9port 600 bar	5067-4107	10/32	5067-1595 5067-1597	5067-1596
G4230B	8pos/9port 600 bar	5067-4107	10/32	5067-1595 5067-1597	5067-1596
	8pos/9port 1200 bar	5067-4121	10/32		
G4231A	2pos/6port 600 bar	5067-4137	10/32	5067-4646	5067-4730
G4231B	2pos/6port 1200 bar	5067-4117	10/32	5067-4646	n. a.
G4232A	2pos/10port 600 bar, micro	5067-4144	M4	5067-4800	5067-5103
G4232B	2pos/10port 1200 bar	5067-4118	10/32	5067-4682	n. a.
G4234A	6pos/14port 600 bar	5067-4146	M4	5067-4729	n. a.
G4234B	6pos/14port 1200 bar	5067-4142	M4	5067-4729	n. a.
G4235A	12pos/13port- Bio 210 bar	5067-4159	10/32	n. a.	n. a.
G5631A	2pos/6port- Bio 600 bar	5067-4148	10/32	n. a.	5067-4767
G5639A	4pos/10port 600 bar	5067-4134	10/32	n. a.	5067-4769

Capillary Kits

Capillary Kit 5067-4646

Table 11 Common capillary kit

Part Number	Connection	Amount
SST-Capillary 340 x 0.12 mm ps ps 1sh 1xlg (p/n 5067-4647) ¹	Autosampler to valve	1
SST-Capillary 700 x 0.17 mm ps ps 1sh 1xlg (p/n 5067-4648) ¹	2 nd pump to valve	1
SST-Capillary 90 x 0.12 mm ps ps 1sh 1xlg (p/n 5067-4649) ¹	Valve to heat exchanger	2
SST-Capillary 150 x 0.12 mm ns ps 1lg 1xlg (p/n 5067-4650) ¹	Short column to valve	2
SST-Capillary 280 x 0.12 mm ns ps 1lg 1xlg (p/n 5067-4651) ¹	Long column to valve	2
SST-Capillary 120 x 0.12 mm ps ps 1xlg 1xlg (p/n 5067-4652) ¹	Valve to valve	1
SST-Capillary 200 x 0.12 mm ps ps 1sh 1xlg (p/n 5067-4653) ¹	Valve to detector	1
TUBING, FLEX (p/n 0890-1713)	Valve to waste	2 m
Heater long-up (0.12 mm i.d., 1.6 µL internal volume) (p/n G1316-80002)		1
Heater long-down (0.12 mm i.d., 1.6 µL internal volume) (p/n G1316-80003)		1
Carrier for heat exchanger (p/n G1316-89200)		2
Fitting holder assy, includes following items: Fitting fork, fitting clip, screws (pack of 4) (p/n G1316-68706)		2
Column clip set, 8 colors (p/n 5042-9918)		1
Plastic fittings (p/n 0100-1259)		4
Bag - plastics (p/n 9222-0518)		1

¹ Fittings: ns: not pre-swaged, ps: pre-swaged; sh: short fitting, lg: long fitting, xlg: extra-long fitting

Capillary Kit 5067-4682

Table 12 Capillary Kit PN 5067-4682

Part Number	Connection	Amount
SST cap. 0.12 mm ID 340 mm pre-swaged (p/n 5067-4684)	Autosampler to Valve	1
SST-Capillary 700 x 0.17 mm ps ps 1sh 1xlg (p/n 5067-4648)	Pump to valve (ACR only)	1
SST cap. 0.12 mm ID 90 mm pre-swaged (p/n 5067-4685)	Valve to heat exchanger	2
SST cap. 0.12 mm ID 150 mm non-swaged (p/n 5067-4686)	Short column to valve	2
SST cap. 0.12 mm ID 280 mm non-swaged (p/n 5067-4687)	Long column to valve	1
SST cap. 0.12 mm ID 120 mm pre-swaged (p/n 5067-4688)	Valve to valve (bypass)	1
SST cap. 0.12 mm ID 200 mm pre-swaged (p/n 5067-4689)	Valve to detector	1
TUBING, FLEX (p/n 0890-1713)	Valve to waste	2
Heater long-up (0.12 mm i.d., 1.6 µL internal volume) (p/n G1316-80002)		1
Heater long-down (0.12 mm i.d., 1.6 µL internal volume) (p/n G1316-80003)		1
Carrier for heat exchanger TCC SL Plus (p/n G1316-89200)		2
Fitting holder assembly (p/n G1316-68706)		2
Plastic fittings (p/n 0100-1259)		4
Column clip set, 8 colors (p/n 5042-9918)		1
Bag - plastics (p/n 9222-0518)		1

Capillary Kit 5067-4729

Table 13 Capillary Kit PN 5067-4729

Part Number	Amount	Unit	Connection
SST Capillary 0.8 mm x 0.11 mm340 mm RF/M4 (p/n 5067-4744) ¹	1	ea	Autosampler to Valve
SST Capillary 0.8 mm x 0.11 mm500 mm RF/M4 (p/n 5067-4745) ¹	1	ea	Sampler (dual stack) to Valve
SST Capillary 0.8 mm x 0.11 mm130 mm lg RF/M4 (p/n 5067-4735) ¹	8	ea	Valve to heat exchanger and column to valve
SST Capillary 0.8 mm x 0.17 mm150 mm lg M4/M4 (p/n 5067-4737) ¹	1	ea	Valve to Valve (bypass)
SST Capillary 0.8 mm x 0.11 mm250 mm lg ps/M4 (p/n 5067-4746) ¹	1	ea	Valve to Detector
Wrench, 4 mm both ends, open end (p/n 8710-1534)	1	ea	
Flexible PEEK tubing (p/n 5022-6503)	1	ea	Valve to Waste
PEEK fitting (p/n G4240-43200)	1	ea	
Heater long-up (0.12 mm i.d., 1.6 µL internal volume) (p/n G1316-80002)	2	ea	
Heater long-down (0.12 mm i.d., 1.6 µL internal volume) (p/n G1316-80003)	2	ea	
Carrier for heat exchanger TCC SL Plus (p/n G1316-89200)	2	ea	
Fitting holder assembly (p/n G1316-68706)	2	ea	
Column clip set, 8 colors (p/n 5042-9918)	1	ea	

¹ Fittings: RF= Removable Fitting connect to Column, Heat Exchanger, M4= always connect to Valve Ports

Capillary Kit 5067-4730

Table 14 Capillary Kit PN 5067-4730

Part Number	Connection	Amount
SS-Capillary 340 mm x 0.17 mm ps-ns, 1sh-1xlg (p/n 5067-4723)	Autosampler to valve	1
SST-Capillary 700 x 0.17 mm ps ps 1sh 1xlg (p/n 5067-4648)	Pump to valve (ACR only)	1
SS-Capillary 90 mm x 0.17 mm ns-ns, 1sh-1xlg (p/n 5067-4724)	Valve to heat exchanger and heat exchanger to column	4
SS-Capillary 150 mm x 0.17 mm ns-ns, 1lg-1xlg (p/n 5067-4720)	Short column to valve	2
SS-Capillary 280 mm x 0.17 mm ns-ns, 1lg-1xlg (p/n 5067-4722)	Long column to valve	2
SS-Capillary 120 mm x 0.17 mm ns-ns, 1xlg-1xlg (p/n 5067-4719)	Valve to valve (bypass)	1
SS-Capillary 200 mm x 0.17 mmmm ns-ps, 1sh-1xlg (p/n 5067-4721)	Valve to detector	1
TUBING, FLEX (p/n 0890-1713)	Valve to waste	2
Column clip set, 8 colors (p/n 5042-9918)		1

Bio-inert Capillary Kit 5067-4767

Table 15 Bio-inert Capillary kit

Description	Amount	Unit	Connection
Plastic fittings (p/n 0100-1259)	4	ea	
TUBING, FLEX (p/n 0890-1713)	2	m	
Column clip set, 8 colors (p/n 5042-9918)	1	ea	
Fingertight fitting long (p/n 5062-8541)	1	ea	
Fitting holder assembly (p/n G1316-68706)	2	ea	
PEEK tubing 1/16" (p/n 0890-1763)	1	ea	column outlet to valve (2x 300 mm) and valve to detector (300 mm)
PEEK/SST capillary (bio-inert) 0.17 mm ID, 400 mm long (p/n G5667-60500)	1	ea	Sampler to Valve
PEEK/SST cap 0.17 mm ID, 300 mm long (p/n G5667-60505)	2	ea	Valve to column

Bio-inert Capillary Kit 5067-4769

Table 16 Bio-inert Capillary Kit

Description	Amount	Unit	Connection
PEEK tubing 1/16" (p/n 0890-1763)	1	ea	From the columns to the valve (4x 300 mm) and from valve to detector (300 mm), low pressure area
PEEK/SST capillary (bio-inert) 0.17 mm ID, 400 mm long (p/n G5667-60500)	1	ea	Sampler to valve
PEEK/SST cap 0.17 mm ID, 300 mm long (p/n G5667-60505)	4	ea	Valve to column
Column clip set, 8 colors (p/n 5042-9918)	1	ea	
Fingertight fitting long (p/n 5062-8541)	1	ea	
Fitting holder assembly (p/n G1316-68706)	2	ea	

Capillary Kit 5067-4800

Table 17 Capillary Kit 5067-4800

Description	Amount	Unit	Connection
SST Capillary 0.8 mm x 0.11 mm340 mm RF/M4 (p/n 5067-4744)	1	ea	Autosampler to valve
SST Cap. 0.17 mm ID 700 mm SW-1/16/M4 (p/n 5067-5120)	1	ea	Pump to valve (ACR only)
SST-Capillary 90x0.11 mm SW-1/16/M4 (p/n 5067-5106)	2	ea	Valve to heat exchanger
SST Capillary 0.8x0.11 mm150 mm lg RF/M4 (p/n 5067-5104)	2	ea	Short column to valve
SST Capillary 0.8x0.11 mm280 mm lg RF/M4 (p/n 5067-5107)	1	ea	Long column to valve
SST Capillary 0.8 mm x 0.17 mm150 mm lg M4/M4 (p/n 5067-4737)	1	ea	Valve to valve (bypass)
SST Capillary 0.8 mm x 0.11 mm250 mm lg ps/M4 (p/n 5067-4746)	1	ea	Valve to detector
Flexible PEEK tubing (p/n 5022-6503)	2	ea	Valve to waste
PEEK fitting (p/n G4240-43200)	2	ea	
Column clip set, 8 colors (p/n 5042-9918)	1	ea	
Fitting holder assembly (p/n G1316-68706)	2	ea	
Heater long-up (0.12 mm i.d., 1.6 µL internal volume) (p/n G1316-80002)	1	ea	
Heater long-down (0.12 mm i.d., 1.6 µL internal volume) (p/n G1316-80003)	1	ea	
Carrier for heat exchanger TCC SL Plus (p/n G1316-89200)	2	ea	

Capillary Kit 5067-5103

Table 18 Capillary Kit 5067-5103

Description	Amount	Unit	Connection
SST-Capillary 340x0.17 mm ps-ns SW-M4 (p/n 5067-5108)	1	ea	Autosampler to valve
SST Cap. 0.17 mm ID 700 mm SW-1/16/M4 (p/n 5067-5120)	1	ea	Pump to valve (ACR only)
SST-Capillary 90x0.17 mm SW-1/16/M4 (p/n 5067-5109)	2	ea	Valve to heat exchanger
SST-Capillary 90x0.17 mm RF/M4 (p/n 5067-5110)	2	ea	Heat exchanger to column
SST Capillary 0.8x0.17 mm150 mm lg RF/M4 (p/n 5067-5111)	2	ea	Short column to valve
SST Capillary 0.8x0.17 mm280 mm lg RF/M4 (p/n 5067-5112)	2	ea	Long column to valve
SST Capillary 0.8 mm x 0.17 mm150 mm lg M4/M4 (p/n 5067-4737)	1	ea	Valve to valve (bypass)
SST Capillary 0.8x0.17 mm250 mm lg ps/M4 (p/n 5067-5113)	1	ea	Valve to detector
Flexible PEEK tubing (p/n 5022-6503)	2	ea	Valve to waste
PEEK fitting (p/n G4240-43200)	2	ea	
Column clip set, 8 colors (p/n 5042-9918)	1	ea	

Tubing Kit

Table 19 Tubing Kit

Description	Amount	Unit	Connection
Solvent tubing, 5 m (p/n 5062-2483)	2	ea	
Adapter, PEEK int. 1/4-28 to ext. 10-32 (p/n 0100-2298)	5	ea	
Bottle-head assembly (p/n G1311-60003)	4	ea	
Tefzel ferrules and SSL lock rings, 1/8 inch, 10/pck (p/n 5063-6598)	1	pk	
PPS nuts, 1/8 inch, 10/pck (p/n 5063-6599)	1	pk	
Tubing clip (2x), re-order 4/pk (p/n 5042-9954)	4	ea	

2 Pos/6 Port Valve Head 600 bar

Item	p/n	Description
	5067-4137	Valve Head 2 Position / 6 Port, 600 bar
1	1535-4857	Stator screws, 10/Pk
2	0101-1417	Stator head
3	0101-1409	Rotor Seal, PEEK
4	1535-4045	Bearing Ring, (Qty 1, replacement)

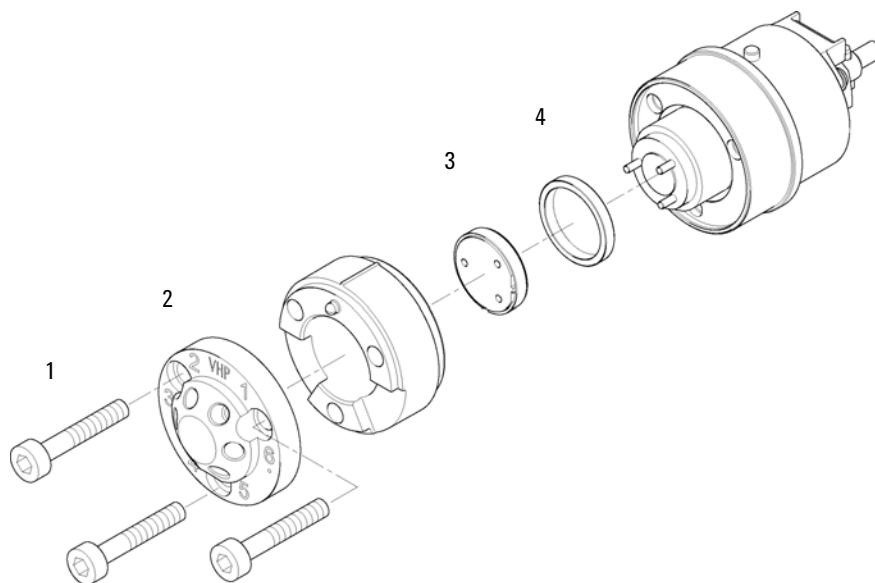


Figure 11 Column Switching Valve Parts (5067-4137)

8 Parts and Materials

2 Pos/6 Port Ultra High Pressure Valve Head 1200 bar

2 Pos/6 Port Ultra High Pressure Valve Head 1200 bar

Item	p/n	Description
	5067-4117	2 pos/6 port ultra high pressure (1200 bar) valve head
1	1535-4857	Stator screws
2	5068-0006	Stator head
3	5068-0008	Rotor seal (Vespel)
4	1535-4045	Bearing Ring, (Qty 1, replacement)

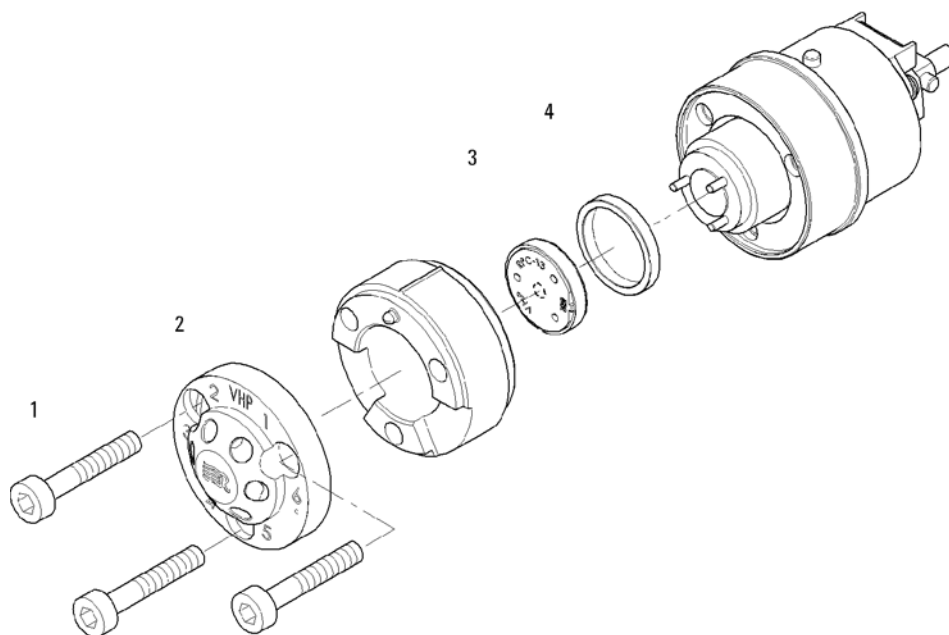


Figure 12 Column Switching Valve Parts (5067-4117)

2 Pos/6 Port Valve Head 600 bar (Bio-inert)



For bio-inert modules use bio-inert parts only!

Item	p/n	Description
	5067-4148	Bio-inert valve head 2 pos/6 port (600 bar)
1	5068-0020	Stator Screws, 10/pack
2	5068-0060	Bio-inert stator head
3	0100-1851	Stator Face
4	0101-1409	Rotor Seal, PEEK
5	1535-4045	Bearing Ring, (Qty 1, replacement)

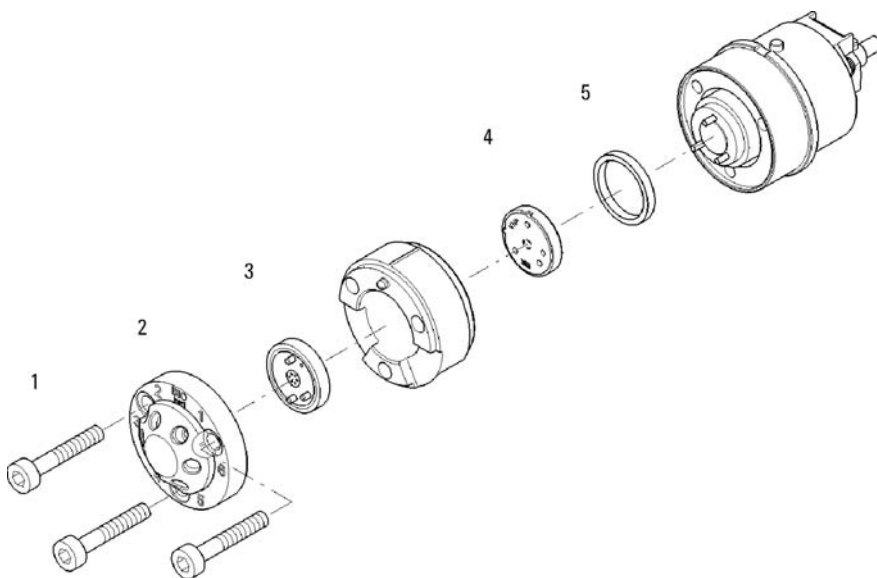


Figure 13 Column Switching Valve Parts

2 Pos/10 Port Micro Valve Head 600 bar

Item	p/n	Description
	5067-4144	Micro Valve Head 2 Position / 10 Port, 600 bar
1	5068-0054	Stator screws, 10/Pk
2	0101-1421	Stator Head
3	0101-1415	Rotor Seal, PEEK
4	1535-4045	Bearing Ring, (Qty 1, replacement)

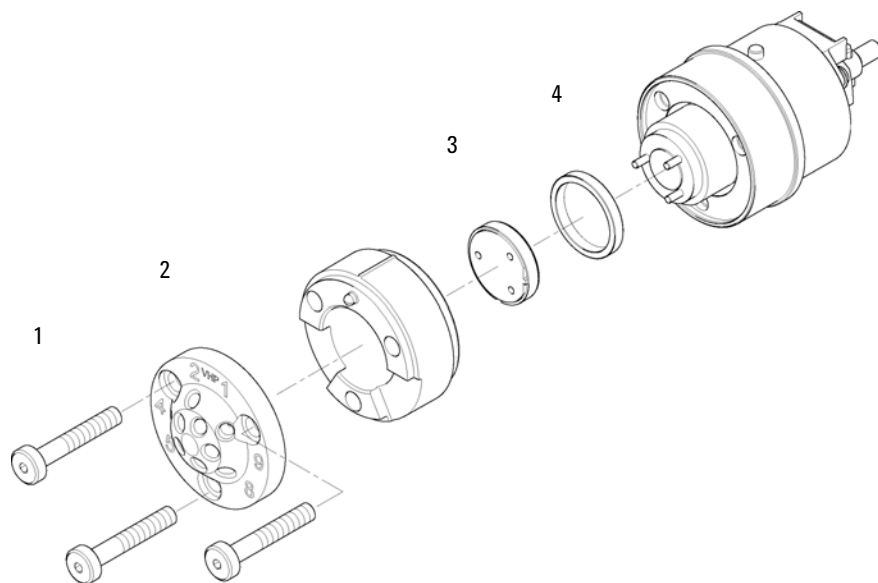


Figure 14 Column Switching Valve Parts (5067-4144)

2 Pos/10 Port Ultra High Pressure Valve Head 1200 bar

Item	p/n	Description
	5067-4118	2 pos/10 port ultra high pressure (1200 bar) valve head
1	5068-0019	Stator screws
2	5068-0011	Stator head
3	5068-0012	Rotor seal (Vespel)
4	1535-4045	Bearing Ring, (Qty 1, replacement)

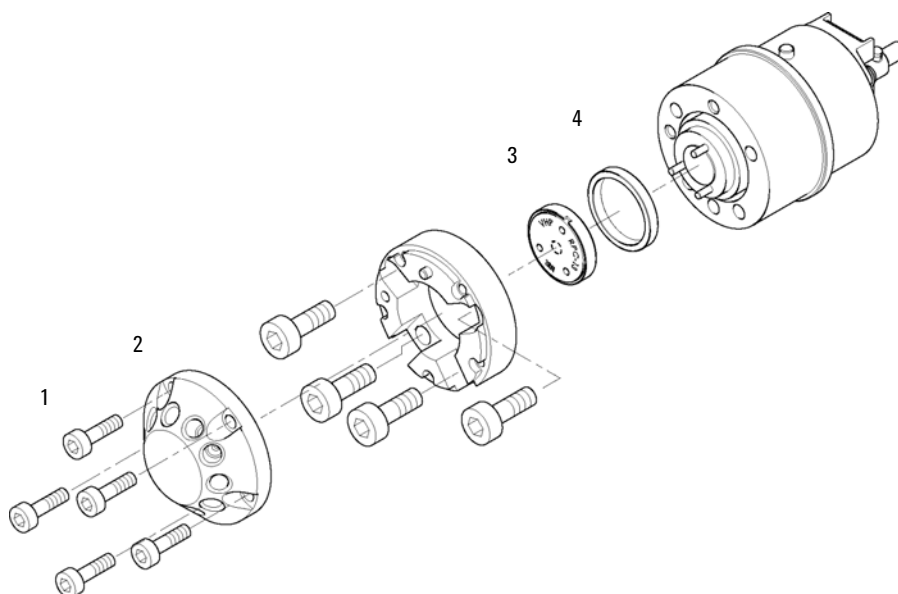


Figure 15 Column Switching Valve Parts (5067-4118)

8 Pos/9 Port Valve Head 600 bar

Item	p/n	Description
	5067-4107	Valve Head 8 Position/9 Port, 600 bar
1	1535-4857	Stator screws
2	5068-0001	Stator head
3	5067-4111	Rotor Seal, PEEK
4	1535-4045	Bearing Ring, (Qty 1, replacement)

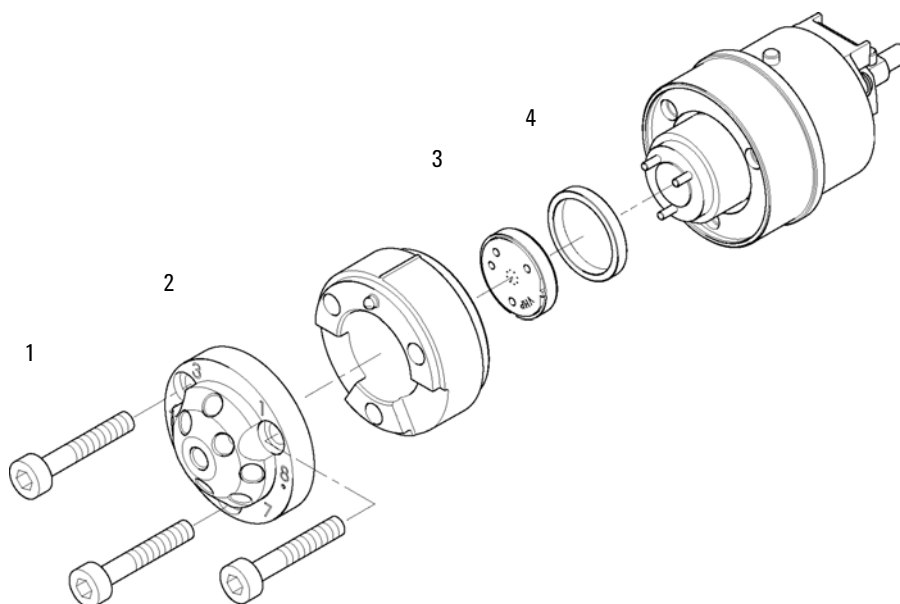


Figure 16 Column Switching Valve Parts (5067-4107)

8 Pos/9 Port Ultra High Pressure Valve Head 1200 bar

Item	p/n	Description
	5067-4121	8 pos/9 port valve head high pressure (1200 bar)
1	1535-4857	Stator screws
2	5068-0001	Stator head
3	5068-0002	Rotor seal (Vespel)
4	1535-4045	Bearing Ring, (Qty 1, replacement)

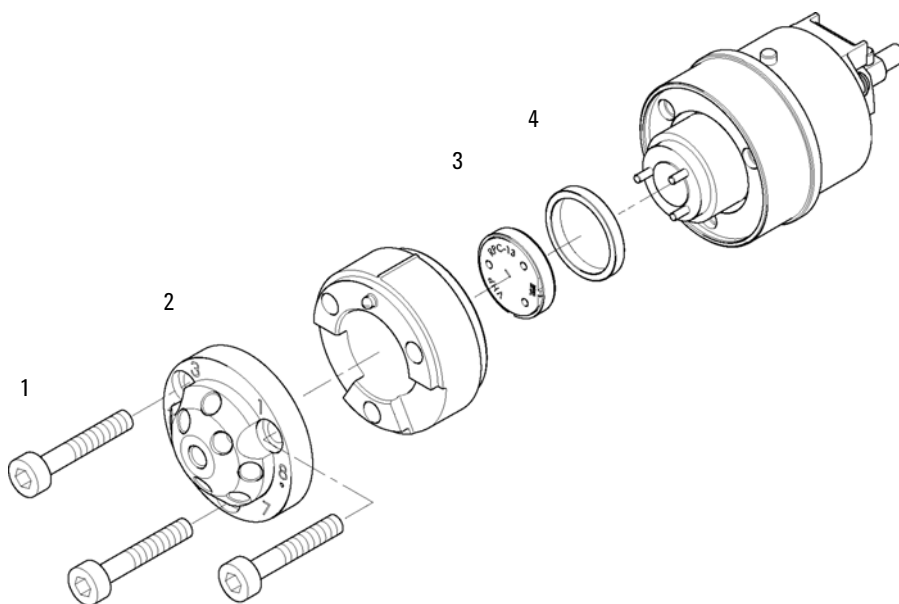


Figure 17 Column Switching Valve Parts (5067-4121)

8 Parts and Materials

Valve Head 4 Column Selector 600 bar (Bio-inert)

Valve Head 4 Column Selector 600 bar (Bio-inert)



For bio-inert modules use bio-inert parts only!

Item	p/n	Description
	5067-4134	Bio-inert valve head 4 column selector (600 bar)
1	5068-0059	Stator screws
2	5068-0044	Bio-inert stator head
3	5068-0093	Stator face assy
4	5068-0045	Bio-inert rotor seal, PEEK
5	1535-4045	Bearing Ring, (Qty 1, replacement)

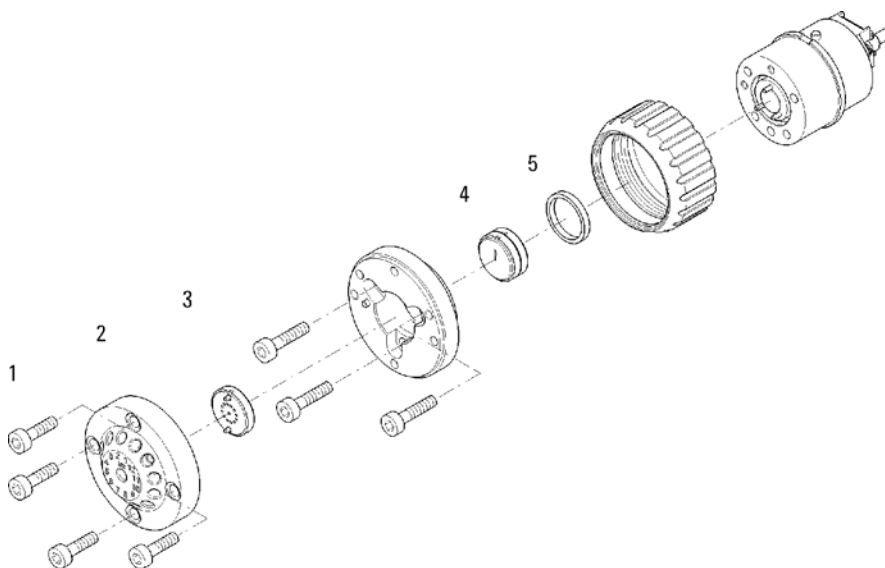


Figure 18 Column Switching Valve Parts

Valve Head 6 Column Selector 600 bar

Item	p/n	Description
	5067-4146	Valve head 6 column selector (600 bar)
1	5068-0089	Stator screws
2	5068-0077	Stator Head
3	5068-0076	Rotor seal, PEEK
4	1535-4045	Bearing Ring, (Qty 1, replacement)

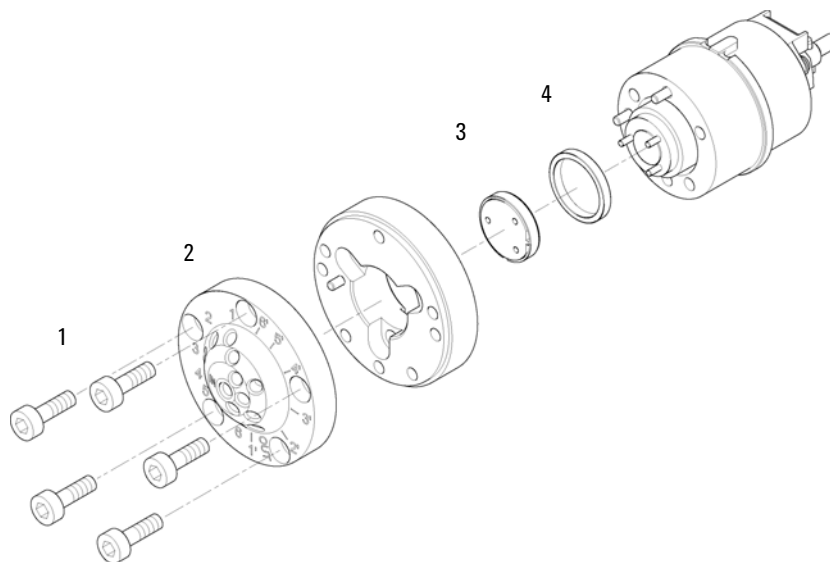


Figure 19 Column Switching Valve Parts

Valve Head 6 Column Selector 1200 bar

Item	p/n	Description
	5067-4142	Valve head 6 column selector (1200 bar)
1	5068-0089	Stator screws
2	5068-0077	Stator Head
3	5068-0067	Rotor seal (Vespel)
4	1534-4045	Bearing ring

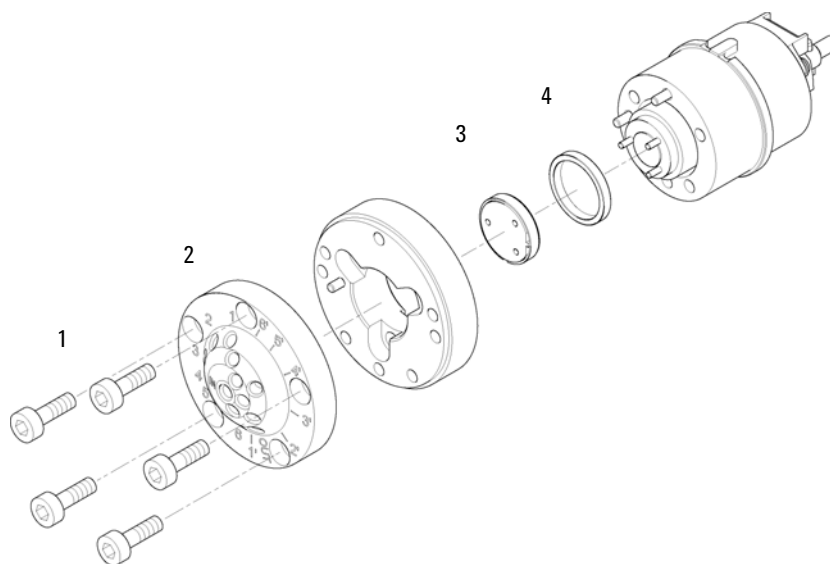


Figure 20 Column Switching Valve Parts

12 Pos/13 Port Valve Head 210 bar (Bio-inert)



For bio-inert modules use bio-inert parts only!

Item	p/n	Description
	5067-4159	Bio-inert selector valve 12 position/13 port (210 bar)
1	5068-0059	Stator screws
2	5068-0097	Bio-inert stator head
3	0101-1288	Bio-inert rotor seal and stator face kit
4	1535-4045	Bearing Ring, (Qty 1, replacement)

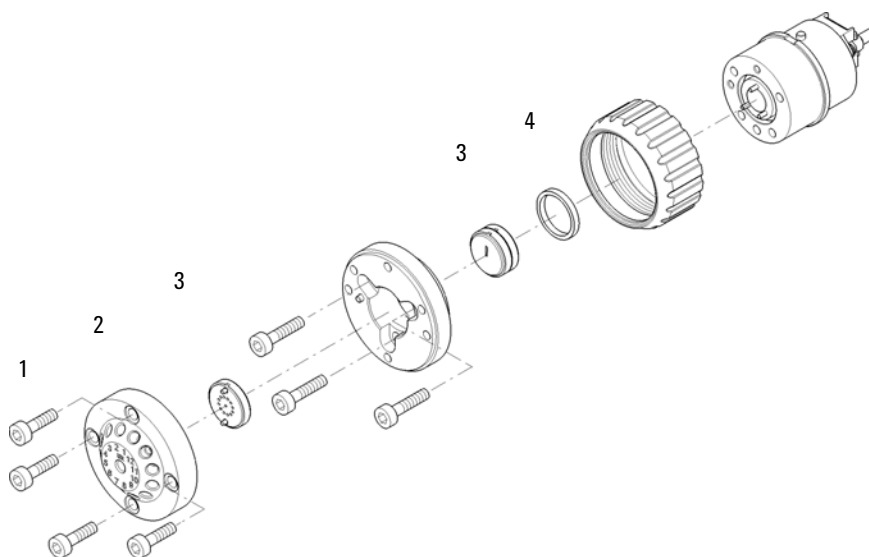
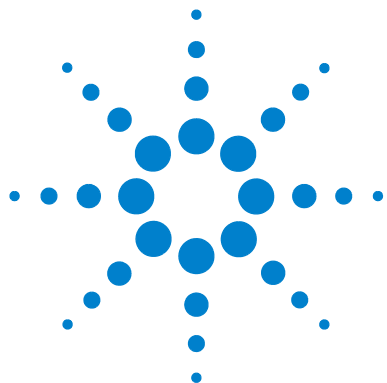


Figure 21 Column Switching Valve Parts

8 Parts and Materials

12 Pos/13 Port Valve Head 210 bar (Bio-inert)



9 Identifying Cables

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This chapter provides information on cables used with the Agilent 1200 Infinity Series modules.



Cable Overview

NOTE

Never use cables other than the ones supplied by Agilent Technologies to ensure proper functionality and compliance with safety or EMC regulations.

Analog cables

p/n	Description
35900-60750	Agilent module to 3394/6 integrators
35900-60750	Agilent 35900A A/D converter
01046-60105	Analog cable (BNC to general purpose, spade lugs)

Remote cables

p/n	Description
03394-60600	Agilent module to 3396A Series I integrators 3396 Series II / 3395A integrator, see details in section “Remote Cables” on page 124
03396-61010	Agilent module to 3396 Series III / 3395B integrators
5061-3378	Remote Cable
01046-60201	Agilent module to general purpose

BCD cables

p/n	Description
03396-60560	Agilent module to 3396 integrators
G1351-81600	Agilent module to general purpose

CAN cables

p/n	Description
5181-1516	CAN cable, Agilent module to module, 0.5 m
5181-1519	CAN cable, Agilent module to module, 1 m

LAN cables

p/n	Description
5023-0203	Cross-over network cable, shielded, 3 m (for point to point connection)
5023-0202	Twisted pair network cable, shielded, 7 m (for point to point connection)

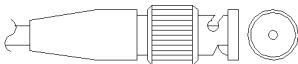
External Contact Cable

p/n	Description
G1103-61611	External contact cable - Agilent module interface board to general purposes

RS-232 cables

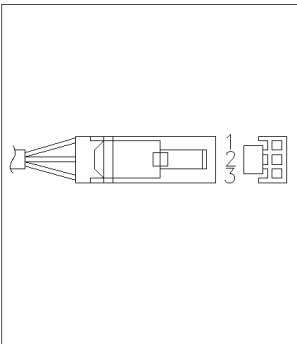
p/n	Description
G1530-60600	RS-232 cable, 2 m
RS232-61600	RS-232 cable, 2.5 m Instrument to PC, 9-to-9 pin (female). This cable has special pin-out, and is not compatible with connecting printers and plotters. It's also called "Null Modem Cable" with full handshaking where the wiring is made between pins 1-1, 2-3, 3-2, 4-6, 5-5, 6-4, 7-8, 8-7, 9-9.
5181-1561	RS-232 cable, 8 m

Analog Cables



One end of these cables provides a BNC connector to be connected to Agilent modules. The other end depends on the instrument to which connection is being made.

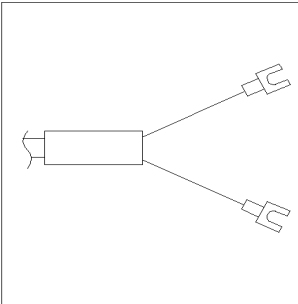
Agilent Module to 3394/6 Integrators

p/n 35900-60750	Pin 3394/6	Pin Agilent module	Signal Name
	1		Not connected
	2	Shield	Analog -
	3	Center	Analog +

Agilent Module to BNC Connector

p/n 8120-1840	Pin BNC	Pin Agilent module	Signal Name
	Shield	Shield	Analog -
	Center	Center	Analog +

Agilent Module to General Purpose

p/n 01046-60105	Pin	Pin Agilent module	Signal Name
	1		Not connected
	2	Black	Analog -
	3	Red	Analog +

Remote Cables



One end of these cables provides a Agilent Technologies APG (Analytical Products Group) remote connector to be connected to Agilent modules. The other end depends on the instrument to be connected to.

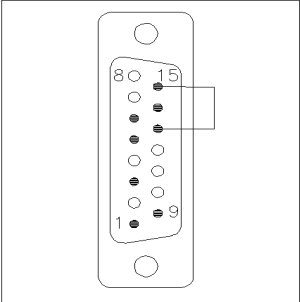
Agilent Module to 3396A Integrators

p/n 03394-60600	Pin 3396A	Pin Agilent module	Signal Name	Active (TTL)
	9	1 - White	Digital ground	
	NC	2 - Brown	Prepare run	Low
	3	3 - Gray	Start	Low
	NC	4 - Blue	Shut down	Low
	NC	5 - Pink	Not connected	
	NC	6 - Yellow	Power on	High
	5,14	7 - Red	Ready	High
	1	8 - Green	Stop	Low
	NC	9 - Black	Start request	Low
	13, 15		Not connected	

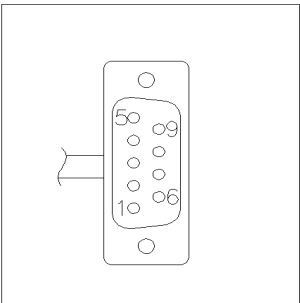
Agilent Module to 3396 Series II / 3395A Integrators

Use the cable Agilent module to 3396A Series I integrators (p/n 03394-60600) and cut pin #5 on the integrator side. Otherwise the integrator prints START; not ready.

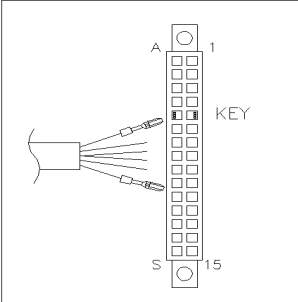
Agilent Module to 3396 Series III / 3395B Integrators

p/n 03396-61010	Pin 33XX	Pin Agilent module	Signal Name	Active (TTL)
	9	1 - White	Digital ground	
	NC	2 - Brown	Prepare run	Low
	3	3 - Gray	Start	Low
	NC	4 - Blue	Shut down	Low
	NC	5 - Pink	Not connected	
	NC	6 - Yellow	Power on	High
	14	7 - Red	Ready	High
	4	8 - Green	Stop	Low
	NC	9 - Black	Start request	Low
	13, 15		Not connected	

Agilent Module to Agilent 35900 A/D Converters

p/n 5061-3378	Pin 35900 A/D	Pin Agilent module	Signal Name	Active (TTL)
	1 - White	1 - White	Digital ground	
	2 - Brown	2 - Brown	Prepare run	Low
	3 - Gray	3 - Gray	Start	Low
	4 - Blue	4 - Blue	Shut down	Low
	5 - Pink	5 - Pink	Not connected	
	6 - Yellow	6 - Yellow	Power on	High
	7 - Red	7 - Red	Ready	High
	8 - Green	8 - Green	Stop	Low
	9 - Black	9 - Black	Start request	Low

Agilent Module to General Purpose

p/n 01046-60201	Wire Color	Pin Agilent module	Signal Name	Active (TTL)
	White	1	Digital ground	
	Brown	2	Prepare run	Low
	Gray	3	Start	Low
	Blue	4	Shut down	Low
	Pink	5	Not connected	
	Yellow	6	Power on	High
	Red	7	Ready	High
	Green	8	Stop	Low
	Black	9	Start request	Low

BCD Cables

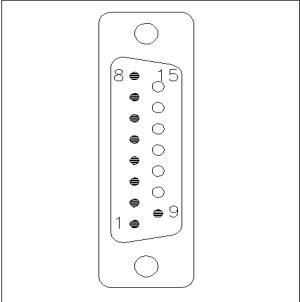


One end of these cables provides a 15-pin BCD connector to be connected to the Agilent modules. The other end depends on the instrument to be connected to

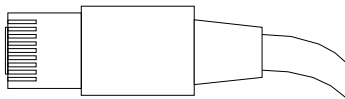
Agilent Module to General Purpose

p/n G1351-81600	Wire Color	Pin Agilent module	Signal Name	BCD Digit
	Green	1	BCD 5	20
	Violet	2	BCD 7	80
	Blue	3	BCD 6	40
	Yellow	4	BCD 4	10
	Black	5	BCD 0	1
	Orange	6	BCD 3	8
	Red	7	BCD 2	4
	Brown	8	BCD 1	2
	Gray	9	Digital ground	Gray
	Gray/pink	10	BCD 11	800
	Red/blue	11	BCD 10	400
	White/green	12	BCD 9	200
	Brown/green	13	BCD 8	100
	not connected	14		
	not connected	15	+ 5 V	Low

Agilent Module to 3396 Integrators

p/n 03396-60560	Pin 3396	Pin Agilent module	Signal Name	BCD Digit
	1	1	BCD 5	20
	2	2	BCD 7	80
	3	3	BCD 6	40
	4	4	BCD 4	10
	5	5	BCD0	1
	6	6	BCD 3	8
	7	7	BCD 2	4
	8	8	BCD 1	2
	9	9	Digital ground	
	NC	15	+ 5 V	Low

CAN/LAN Cables



Both ends of this cable provide a modular plug to be connected to Agilent modules CAN or LAN connectors.

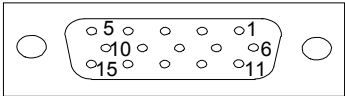
CAN Cables

p/n	Description
5181-1516	CAN cable, Agilent module to module, 0.5 m
5181-1519	CAN cable, Agilent module to module, 1 m

LAN Cables

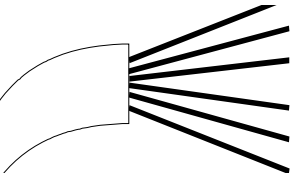
p/n	Description
5023-0203	Cross-over network cable, shielded, 3 m (for point to point connection)
5023-0202	Twisted pair network cable, shielded, 7 m (for point to point connection)

External Contact Cable



One end of this cable provides a 15-pin plug to be connected to Agilent modules interface board. The other end is for general purpose.

Agilent Module Interface Board to general purposes

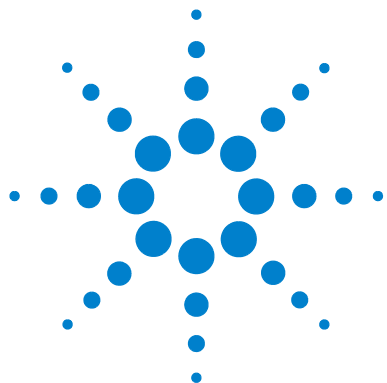
p/n G1103-61611	Color	Pin Agilent module	Signal Name
	White	1	EXT 1
	Brown	2	EXT 1
	Green	3	EXT 2
	Yellow	4	EXT 2
	Grey	5	EXT 3
	Pink	6	EXT 3
	Blue	7	EXT 4
	Red	8	EXT 4
	Black	9	Not connected
	Violet	10	Not connected
	Grey/pink	11	Not connected
	Red/blue	12	Not connected
	White/green	13	Not connected
	Brown/green	14	Not connected
	White/yellow	15	Not connected

Agilent Module to PC

p/n	Description
G1530-60600	RS-232 cable, 2 m
RS232-61600	RS-232 cable, 2.5 m Instrument to PC, 9-to-9 pin (female). This cable has special pin-out, and is not compatible with connecting printers and plotters. It's also called "Null Modem Cable" with full handshaking where the wiring is made between pins 1-1, 2-3, 3-2, 4-6, 5-5, 6-4, 7-8, 8-7, 9-9.
5181-1561	RS-232 cable, 8 m

9 Identifying Cables

Agilent Module to PC



10 Hardware Information

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This chapter describes the module in more detail on hardware and electronics.



Electrical Connections

- The CAN bus is a serial bus with high speed data transfer. The two connectors for the CAN bus are used for internal module data transfer and synchronization.
- The power input socket accepts a line voltage of 100 – 240 VAC $\pm 10\%$ with a line frequency of 50 or 60 Hz. Maximum power consumption varies by module. There is no voltage selector on your module because the power supply has wide-ranging capability. There are no externally accessible fuses, because automatic electronic fuses are implemented in the power supply.

NOTE

Never use cables other than the ones supplied by Agilent Technologies to ensure proper functionality and compliance with safety or EMC regulations.

Serial Number Information (ALL)

The serial number information on the instrument labels provide the following information:

CCYWWSSSSS	Format
CC	country of manufacturing • DE = Germany • JP = Japan • CN = China
YWW	year and week of last major manufacturing change, e.g. 820 could be week 20 of 1998 or 2008
SSSSS	real serial number

Front and Rear View of the Module

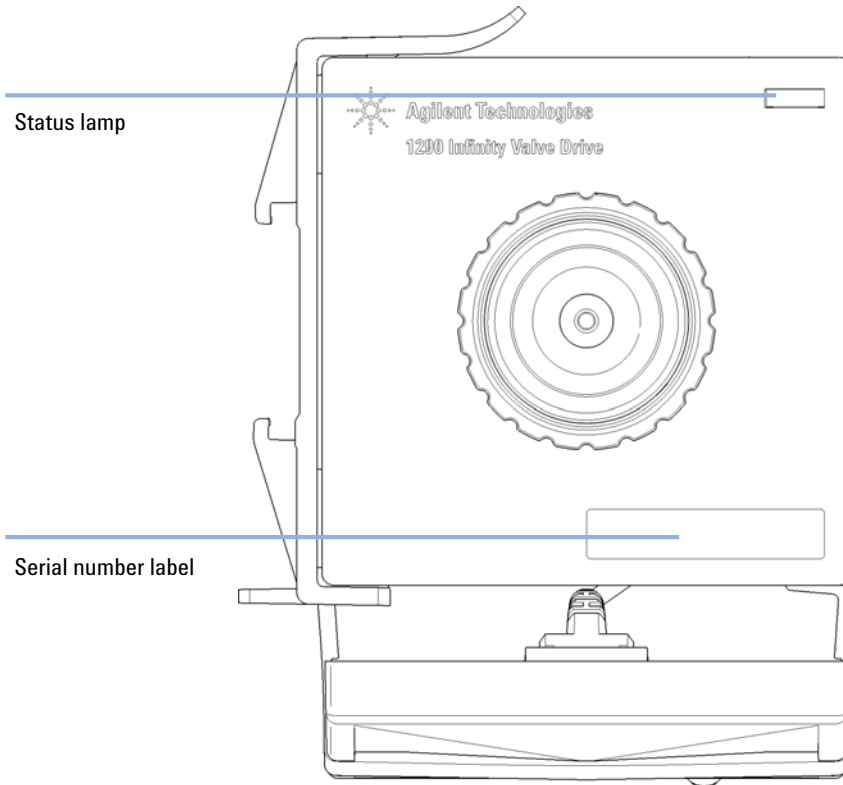


Figure 22 Front View of 1290 Infinity Valve Drive

10 Hardware Information
Electrical Connections

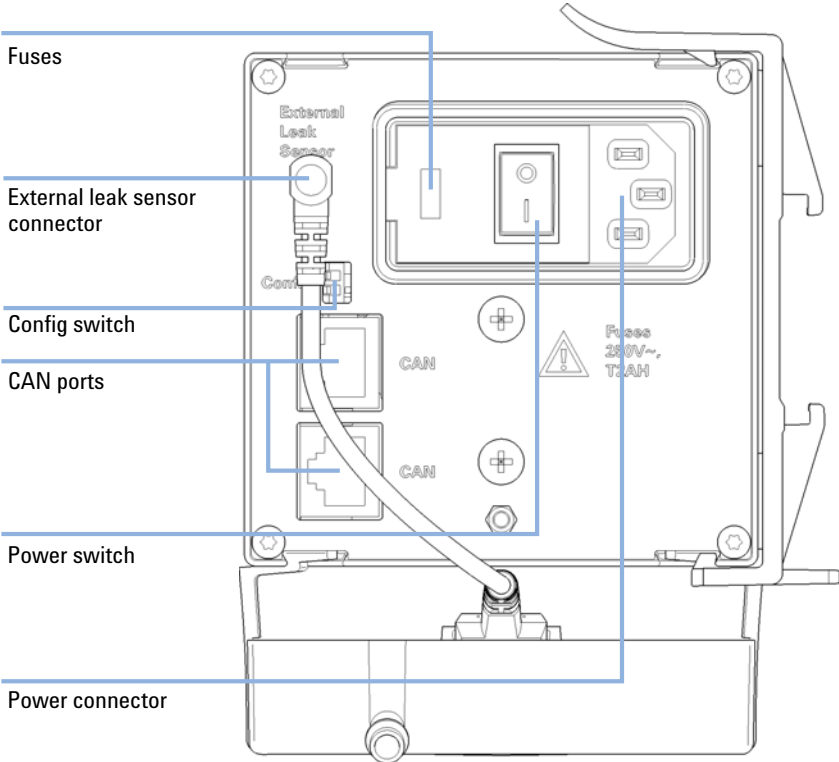


Figure 23 Rear View of 1290 Infinity Valve Drive

Interfaces

The Agilent 1200 Infinity Series modules provide the following interfaces:

Table 20 Agilent 1200 Infinity Series Interfaces

Module	CAN	LAN/BCD (optional)	LAN (on-board)	RS-232	Analog	APG Remote	Special
Pumps							
G1310B Iso Pump	2	Yes	No	Yes	1	Yes	
G1311B Quat Pump							
G1311C Quat Pump VL							
G1312B Bin Pump							
G1312C Bin Pump VL							
1376A Cap Pump							
G2226A Nano Pump							
G5611A Bio-inert Quat Pump							
G4220A/B Bin Pump	2	No	Yes	Yes	No	Yes	
G1361A Prep Pump	2	Yes	No	Yes	No	Yes	CAN-DC- OUT for CAN slaves
Samplers							
G1329B ALS	2	Yes	No	Yes	No	Yes	THERMOSTAT for G1330B
G2260A Prep ALS							
G1364B FC-PS	2	Yes	No	Yes	No	Yes	THERMOSTAT for G1330B
G1364C FC-AS							
G1364D FC- μ S							CAN-DC- OUT for CAN slaves
G1367E HiP ALS							
G1377A HiP micro ALS							
G2258A DL ALS							
G5664A Bio-inert FC-AS							
G5667A Bio-inert Autosampler							
G4226A ALS	2	Yes	No	Yes	No	Yes	
Detectors							
G1314B VWD VL	2	Yes	No	Yes	1	Yes	
G1314C VWD VL+							

Table 20 Agilent 1200 Infinity Series Interfaces

Module	CAN	LAN/BCD (optional)	LAN (on-board)	RS-232	Analog	APG Remote	Special
G1314E/F VWD	2	No	Yes	Yes	1	Yes	
G4212A/B DAD	2	No	Yes	Yes	1	Yes	
G1315C DAD VL+ G1365C MWD G1315D DAD VL G1365D MWD VL	2	No	Yes	Yes	2	Yes	
G1321B FLD G1362A RID	2	Yes	No	Yes	1	Yes	
G4280A ELSD	No	No	No	Yes	Yes	Yes	EXT Contact AUTOZERO
Others							
G1170A Valve Drive	2	No	No	No	No	No	Requires a HOST module with on-board LAN (e.g. G4212A or G4220A with minimum firmware B.06.40 or C.06.40) or with additional G1369C LAN Card
G1316A/C TCC	2	No	No	Yes	No	Yes	
G1322A DEG	No	No	No	No	No	Yes	AUX
G1379B DEG	No	No	No	Yes	No	Yes	
G4225A DEG	No	No	No	Yes	No	Yes	
G4227A Flex Cube	2	No	No	No	No	No	
G4240A CHIP CUBE	2	Yes	No	Yes	No	Yes	CAN-DC- OUT for CAN slaves THERMOSTAT for G1330A/B (NOT USED)

NOTE

The detector (DAD/MWD/FLD/VWD/RID) is the preferred access point for control via LAN. The inter-module communication is done via CAN.

- CAN connectors as interface to other modules
- LAN connector as interface to the control software
- RS-232C as interface to a computer
- REMOTE connector as interface to other Agilent products
- Analog output connector(s) for signal output

Overview Interfaces

CAN

The CAN is inter-module communication interface. It is a 2-wire serial bus system supporting high speed data communication and real-time requirement.

LAN

The modules have either an interface slot for an LAN card (e.g. Agilent G1369B/C LAN Interface) or they have an on-board LAN interface (e.g. detectors G1315C/D DAD and G1365C/D MWD). This interface allows the control of the module/system via a PC with the appropriate control software.

NOTE

If an Agilent detector (DAD/MWD/FLD/VWD/RID) is in the system, the LAN should be connected to the DAD/MWD/FLD/VWD/RID (due to higher data load). If no Agilent detector is part of the system, the LAN interface should be installed in the pump or autosampler.

RS-232C (Serial)

The RS-232C connector is used to control the module from a computer through RS-232C connection, using the appropriate software. This connector can be configured with the configuration switch module at the rear of the module. Refer to *Communication Settings for RS-232C*.

NOTE

There is no configuration possible on main boards with on-board LAN. These are pre-configured for

- 19200 baud,
- 8 data bit with no parity and
- one start bit and one stop bit are always used (not selectable).

The RS-232C is designed as DCE (data communication equipment) with a 9-pin male SUB-D type connector. The pins are defined as:

Table 21 RS-232C Connection Table

Pin	Direction	Function
1	In	DCD
2	In	RxD
3	Out	TxD
4	Out	DTR
5		Ground
6	In	DSR
7	Out	RTS
8	In	CTS
9	In	RI

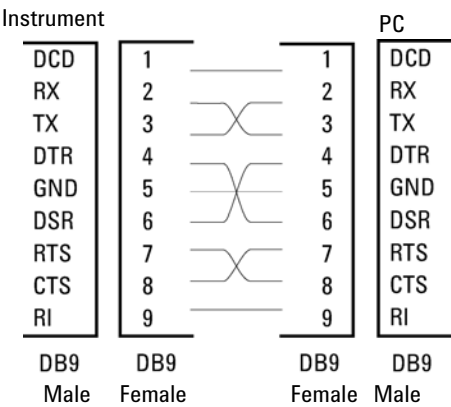


Figure 24 RS-232 Cable

Analog Signal Output

The analog signal output can be distributed to a recording device. For details refer to the description of the module’s main board.

APG Remote

The APG Remote connector may be used in combination with other analytical instruments from Agilent Technologies if you want to use features as common shut down, prepare, and so on.

Remote control allows easy connection between single instruments or systems to ensure coordinated analysis with simple coupling requirements.

The subminiature D connector is used. The module provides one remote connector which is inputs/outputs (wired- or technique).

To provide maximum safety within a distributed analysis system, one line is dedicated to **SHUT DOWN** the system's critical parts in case any module detects a serious problem. To detect whether all participating modules are switched on or properly powered, one line is defined to summarize the **POWER ON** state of all connected modules. Control of analysis is maintained by signal readiness **READY** for next analysis, followed by **START** of run and optional **STOP** of run triggered on the respective lines. In addition **PREPARE** and **START REQUEST** may be issued. The signal levels are defined as:

- standard TTL levels (0 V is logic true, + 5.0 V is false),
- fan-out is 10 V,
- input load is 2.2 kOhm against + 5.0 V, and
- output are open collector type, inputs/outputs (wired- or technique).

NOTE

All common TTL circuits operate with a 5 V power supply. A TTL signal is defined as "low" or L when between 0 V and 0.8 V and "high" or H when between 2.0 V and 5.0 V (with respect to the ground terminal).

Table 22 Remote Signal Distribution

Pin	Signal	Description
1	DGND	Digital ground
2	PREPARE	(L) Request to prepare for analysis (for example, calibration, detector lamp on). Receiver is any module performing pre-analysis activities.
3	START	(L) Request to start run / timetable. Receiver is any module performing run-time controlled activities.
4	SHUT DOWN	(L) System has serious problem (for example, leak: stops pump). Receiver is any module capable to reduce safety risk.
5		Not used
6	POWER ON	(H) All modules connected to system are switched on. Receiver is any module relying on operation of others.
7	READY	(H) System is ready for next analysis. Receiver is any sequence controller.
8	STOP	(L) Request to reach system ready state as soon as possible (for example, stop run, abort or finish and stop injection). Receiver is any module performing run-time controlled activities.
9	START REQUEST	(L) Request to start injection cycle (for example, by start key on any module). Receiver is the autosampler.

Special Interfaces

Some modules have module specific interfaces/connectors. They are described in the module documentation.

Config Switch Settings of the Infinity Valve Drive

Config Switch Settings of the Infinity Valve Drive

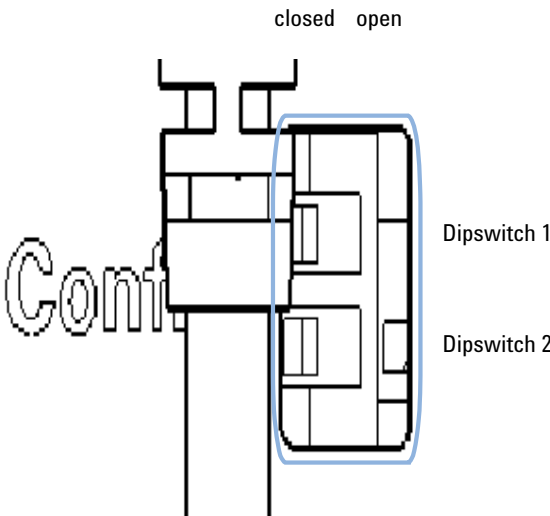


Figure 25 Config Switches

Dipswitch 1	Dipswitch 2	Function
open	open	Default/Standard Operation Mode
open	closed	Forced Cold Start
closed	open	Resident Mode
closed	closed	Not Supported

Special Settings

Boot-Resident

Firmware update procedures may require this mode in case of firmware loading errors (main firmware part). If you use the following switch settings and power the instrument up again, the instrument firmware stays in the resident mode. It is not operable as a module. It only uses basic functions of the operating system for example, for communication. In this mode the main firmware can be loaded (using update utilities).

Forced Cold Start

A forced cold start can be used to bring the module into a defined mode with default parameter settings.

CAUTION

Loss of data

Forced cold start erases all methods and data stored in the non-volatile memory. Exceptions are calibration settings, diagnosis and repair log books which will not be erased.

→ Save your methods and data before executing a forced cold start.

10 Hardware Information

Config Switch Settings of the Infinity Valve Drive



11 Appendix

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This chapter provides addition information on safety, legal and web.



General Safety Information

General Safety Information

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. Agilent Technologies assumes no liability for the customer's failure to comply with these requirements.

WARNING

Ensure the proper usage of the equipment.

The protection provided by the equipment may be impaired.

→ The operator of this instrument is advised to use the equipment in a manner as specified in this manual.

Safety Standards

This is a Safety Class I instrument (provided with terminal for protective earthing) and has been manufactured and tested according to international safety standards.

Operation

Before applying power, comply with the installation section. Additionally the following must be observed.

Do not remove instrument covers when operating. Before the instrument is switched on, all protective earth terminals, extension cords, auto-transformers, and devices connected to it must be connected to a protective earth via a ground socket. Any interruption of the protective earth grounding will cause a potential shock hazard that could result in serious personal injury. Whenever it is likely that the protection has been impaired,

the instrument must be made inoperative and be secured against any intended operation.

Make sure that only fuses with the required rated current and of the specified type (normal blow, time delay, and so on) are used for replacement. The use of repaired fuses and the short-circuiting of fuse holders must be avoided.

Some adjustments described in the manual, are made with power supplied to the instrument, and protective covers removed. Energy available at many points may, if contacted, result in personal injury.

Any adjustment, maintenance, and repair of the opened instrument under voltage should be avoided whenever possible. When inevitable, this has to be carried out by a skilled person who is aware of the hazard involved. Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present. Do not replace components with power cable connected.

Do not operate the instrument in the presence of flammable gases or fumes. Operation of any electrical instrument in such an environment constitutes a definite safety hazard.

Do not install substitute parts or make any unauthorized modification to the instrument.

Capacitors inside the instrument may still be charged, even though the instrument has been disconnected from its source of supply. Dangerous voltages, capable of causing serious personal injury, are present in this instrument. Use extreme caution when handling, testing and adjusting.

When working with solvents, observe appropriate safety procedures (for example, goggles, safety gloves and protective clothing) as described in the material handling and safety data sheet by the solvent vendor, especially when toxic or hazardous solvents are used.

Safety Symbols

Table 23 Safety Symbols

Symbol	Description
	The apparatus is marked with this symbol when the user should refer to the instruction manual in order to protect risk of harm to the operator and to protect the apparatus against damage.
	Indicates dangerous voltages.
	Indicates a protected ground terminal.
	Indicates eye damage may result from directly viewing the light produced by the deuterium lamp used in this product.
	The apparatus is marked with this symbol when hot surfaces are available and the user should not touch it when heated up.

WARNING

A WARNING

alerts you to situations that could cause physical injury or death.

- Do not proceed beyond a warning until you have fully understood and met the indicated conditions.

CAUTION

A CAUTION

alerts you to situations that could cause loss of data, or damage of equipment.

- Do not proceed beyond a caution until you have fully understood and met the indicated conditions.

The Waste Electrical and Electronic Equipment Directive

Abstract

The Waste Electrical and Electronic Equipment (WEEE) Directive (2002/96/EC), adopted by EU Commission on 13 February 2003, is introducing producer responsibility on all electric and electronic appliances starting with 13 August 2005.

NOTE

This product complies with the WEEE Directive (2002/96/EC) marking requirements. The affixed label indicates that you must not discard this electrical/electronic product in domestic household waste.

Product Category:

With reference to the equipment types in the WEEE Directive Annex I, this product is classed as a Monitoring and Control Instrumentation product.



NOTE

Do not dispose off in domestic household waste

To return unwanted products, contact your local Agilent office, or see www.agilent.com for more information.

Radio Interference

Cables supplied by Agilent Technologies are screened to provide optimized protection against radio interference. All cables are in compliance with safety or EMC regulations.

Test and Measurement

If test and measurement equipment is operated with unscreened cables, or used for measurements on open set-ups, the user has to assure that under operating conditions the radio interference limits are still met within the premises.

Sound Emission

Manufacturer's Declaration

This statement is provided to comply with the requirements of the German Sound Emission Directive of 18 January 1991.

This product has a sound pressure emission (at the operator position) < 70 dB.

- Sound Pressure L_p < 70 dB (A)
- At Operator Position
- Normal Operation
- According to ISO 7779:1988/EN 27779/1991 (Type Test)

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Select Products/Chemical Analysis

It will provide also the latest firmware of the modules for download.

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In This Book

This User's Guide describes common applications as well as installation, operation and maintenance of the Agilent Infinity Valve Drive and Agilent Quick Change Valve heads.

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